FOOTPRINT ECOLOGY

Urban development and the Dorset Heaths: long term analysis & evidence base review

Chris Panter, Durwyn Liley, Zoe Caals, Phil Saunders & Ralph Clarke

FOOTPRINT ECOLOGY, FOREST OFFICE, BERE ROAD, WAREHAM, DORSET BH20 7PA
WWW.FOOTPRINT-ECOLOGY.CO.UK
01929 552444

FOOTPRINT ECOLOGY

Footprint Contract Reference: 616
Date: 4th November 2022
Version: Final
Recommended Citation: Panter, C., Liley, D., Caals, Z., Saunders, P. & Clarke, R. (2022). Urban development and the Dorset Heaths: long term analysis & evidence base review. Unpublished report by Footprint Ecology for the Urban Heaths Partnership

Summary

This report is a review of monitoring data (2007-2020) relating to the Dorset Heaths Planning Framework. The Framework provides mitigation for impacts from urban development and recreation, associated with new housing growth, on the Dorset Heaths. The report has been commissioned by Bournemouth, Christchurch and Poole (BCP) and Dorset Councils to review mitigation delivery and effectiveness to date and use the results to consider the implications for future mitigation delivery. The report is in two clear parts – the bulk of the report uses available data to summarise the amount of mitigation achieved to date and summarises how visitor patterns, impacts and aspects of the ecology of the European sites have changed, broadly focussing on the period 2007-2021 (note for some data the temporal coverage is slightly different). The second part of the report looks to the future and considers the implications in terms of future mitigation delivery.

Review of mitigation delivery and effectiveness to date

The number of dwellings within 5km of the Dorset Heaths has increased by 6.4% (2007-2021).

Data on visitor numbers comes from counts of parked vehicles (regular transects covering most heath parking locations) and from automated visitor counters ('sensors'). The vehicle counts provide a surrogate measure and clearly do not capture data on those who arrive on foot. The sensor data are very discrete in space and time and few sensors provide comparable data for the whole period of interest. The number of vehicles on individual heaths has increased on average by around 10-13% (2010-13 compared to 2017-20). Over the same period, the total number of vehicles across the heaths as a whole has increased by around 27% (based on vehicle counts for core heath locations only, i.e. excluding those with locations with visitor centres or access to coast, harbour etc). The increases particularly relate to the spring school holiday, spring weekends and spring and summer bank holidays. There is considerable variation between different heaths, for example overall the number of cars has decreased at 8 sites and increased at 16. There are 12 heaths where sensor data allows meaningful comparison for the period 2008-2010 with 2017-19. These data suggest visitor numbers have increased at 5 sites and decreased at 7 and on average there is no meaningful change over time.

We could find no relationship between housing growth and change in access, i.e. those heaths where access levels had increased had not had greater levels of housing growth in their vicinity.

The number of incidents logged by wardens and the number of fires has decreased since 2007. Nonetheless, fire incidence continues to be a key threat to the Dorset Heaths and the area that has burnt has increased over time. The pattern of bigger fires highlights a key area of concern for the future. While fire incidence is clearly focussed around the more urban

heaths, there was no evidence that changes in fire incidence or area burnt was correlated with housing change around individual heaths.

Bird data for different heaths show that Dartford Warbler numbers dropped at several key sites following extreme winter weather in 2009/10, with some subsequent recovery (particularly at Arne), but the species has ultimately declined at the majority of localities over the study period. Nightjar numbers have increased across the majority of monitored locations during the study period, whilst Woodlark numbers have shown marked fluctuations at different sites. There is no evidence that the change in bird numbers (of any of the three species) has been different on sites with more housing or more visitors, suggesting that other factors (such as climate or habitat management) may be driving the changes observed.

Mitigation for housing growth has included SAMM (wardening, Dorset Dogs, Firewise, school visits, monitoring etc.) and Heathland Infrastructure Projects (HIPs) that include the provision of Suitable Alternative Natural Greenspace (SANG). Key statistics relating to mitigation delivery (for 2019/20) include around 2,360 members of Dorset Dogs, up to 34 different schools visited, an average of around 3,089 hours of warden time per year and a total area of approximately 279ha of SANG (across 18 sites) to date, with approximately a further 115ha committed but yet to be delivered.

Data are building to show that HIPs/SANGs are effective and working to deflect access from the heaths. While each HIP/SANG is different in character, the data across SANGs show they are well used and use has been increasing over time and increasing relative to the heaths. Some SANGs are drawing high numbers of dog walkers in particular. The visitor profile for SANGs and the Heaths are very similar. On average, most (75%) of SANG visitors originate from 3.9km, indicating relatively broad catchments. Postcode data from the heaths and the HIPs/SANG show a clear overlap, indicating that the HIPs/SANGs are drawing visitors from areas we know people who visit the heaths live. The vehicle count data show a significant positive correlation between the number of vehicles counted on SANGs and the number counted on 'core' heaths, showing that when there are more visitors on the heaths there also tend to be more visitors on the SANGs. There is also some suggestion that over time the proportion of vehicles counted on the SANGs has increased relative to the counts on the heaths. Visit rates on SANG sites correlate with the weighted housing variable and with the amount of housing change (2007-21) within 5km, suggesting that use of SANGs is related to the amount of housing nearby. There is however insufficient evidence to suggest that the increase in vehicle counts or other measures of visitor use on the heaths, relative to the increase in nearby housing at SSSIs decreases with the total number or area of nearby SANGS and large HIPs.

Implications for future mitigation delivery

We review the results and consider the context (e.g. national trends in countryside access, impacts of covid and climate change) and implications for future mitigation delivery. Data

provided by BCP and Dorset Councils suggest a very approximate potential increase in the number of dwellings within 5km of the Dorset Heaths of 19% (over the period 2021-2038). Given both Councils are at different stages in plan-making these figures are inevitably approximate and a best guess at this point in time. Nonetheless, the annual rate of housing growth of the period 2021-2038 suggests a level of change more than 3x that of the period 2007-2021.

We identify the following key summary points as suggestions for future mitigation delivery, above those measures already in place:

- Greater cross-over with other mitigation schemes (e.g. adjacent European sites), potentially to ensure cost savings in mitigation delivery and potential for measures to apply across multiple sites (e.g. the Dorset Heaths, New Forest, Poole Harbour);
- Continued and expanded collaboration between heathland areas in different parts of the country to share experience of mitigation approaches and best practice;
- Flexibility in the use of mitigation funds to respond to emerging issues/trends and exploit opportunities (such as other funding streams) as available;
- Increased warden provision with more warden time patrolling sites and extending reach of warden team to more rural sites as appropriate, targeted using monitoring data;
- Increased use of behavioural change techniques, marketing and branding to influence visitor behaviour (dog on leads a particular focus);
- Expansion of Dorset Dogs with more targeted messaging and campaigning relating to specific sites or issues and extending the reach beyond the existing membership;
- Increased targeting of funds towards parking management around the heaths, especially in areas where there are lots of small, scattered parking locations or roadside parking (e.g. some of the Purbeck heaths, Wareham Forest, Holt Heath);
- Wider communication around barbeques and campfires, building and continuing the existing campaign and potentially working with charcoal retailers, shops and other outlets;
- Additional vegetation management to reduce fuel load and fire risk;
- Greater role for HIPs and small-scale infrastructure to improve green infrastructure to join existing SANG and connect greenspaces, providing for more variation in recreation experience;
- Further large SANGs of at least 20ha (and ideally much more) to provide a range of routes and destinations, potentially able to cope with different activities and types of access;
- Creating the potential for more longer cycle routes in and around SANGs;
- Provision of an area or areas that provide for mountain biking and dirt jump use away from sensitive locations;
- Creation of path links, new parking and wider path network around existing SANGs, providing better links and connectivity;
- Inclusion of electric vehicle charging at some SANG locations where more formal parking provision available;

- Provision of safe bike parking (e.g. ebikes) and ability to lock bikes (relevant to both the SANGs and heaths) and charge them;
- Use of art, landscaping and good design to maximise the potential for SANG and GI to work as inspiring, celebrated multi-functional spaces;
- Better promotion of HIP/SANG sites to help direct use and ensure dog walking, cycling and other types of recreation use that potentially conflict can be separated, with promotion expanded through health centres, local community resources etc;
- A system to log and map warden time and effort;
- Continuation of existing monitoring threads, ensuring in particular that vehicle counts are comprehensive and a core set of sensors are 'ring fenced' to provide long term trend data;
- Bird data recorded more systematically in GIS to ensure survey coverage accurately reflected.
- Additional monitoring data utilising a simple vantage point approach to log different activities being undertaken by visitors on the heaths.

Contents

Acknowledgements

This report has been commissioned jointly by BCP Council and Dorset Council. Our thanks to Paul Attwell (Urban Heaths Partnership) and Jade North (Dorset Council), for help, support, data provision and overseeing the commission. We are also grateful to the following for providing data, useful discussion and comment: Sue Bellamy (Dorset Council), Laura Bright (BCP), Steve Boyt (Dorset Council), Jon Corkill (Dorset Environmental Records Centre), Chris Dieck (RSPB), Steve Dring (BCP), Terry Elborn (BCP), Malcolm Hodges (BCP), Chloe Lewis (UHP); Rachel Pearce (UHP), Nick Squirrell (Natural England) and Debbie Turner (Dorset Council).

1. Overall introduction and context

Overview

1.1 The Dorset Heaths Planning Framework provides mitigation for new housing growth, addressing the impacts from urban effects and recreation on the Dorset Heaths. The Framework is a long established approach to ensure adequate protection for the heaths from the cumulative effects of housing growth over a wide area.

1.2 This report is both a review of monitoring data (over the period 2007-2020) relating to the Framework and a look forward to consider the implications, in light of the future housing growth. The report has been commissioned by Bournemouth, Christchurch and Poole (BCP) and Dorset Councils to inform their emerging Local Plans and the requirements for future mitigation delivery.

The Dorset Heaths

1.3 Dorset holds some 7,500ha of lowland heathland and the Dorset heaths represent some of the biggest and finest remaining areas of lowland heathland in the UK. They lie on infertile soils derived from the sands and clays of the Bagshot Beds and include shallow peat in wetter areas, and extend from the River Avon in the east to Warmwell in the west. The heaths support a full range of heathland vegetation communities including transitions from dry heaths to wet lowland heathland and mires, all habitats restricted to the Atlantic Fringe of Europe and among the best of their type in the UK. There are also transitions to coastal wetlands and floodplain fen habitats, plus woodland, grassland, and pools. The whole complex has an outstanding fauna in a European context, covering many different taxa. The heaths lie in one of the most biologically-rich wetland areas of lowland Britain, being continuous with three other European sites: Poole Harbour, Avon Valley and The New Forest.

1.4 Much of the Heaths are designated as being of European importance (Map 1), with the Dorset Heathlands Special Protection Area (SPA) classified for breeding and wintering bird interest and two Special Areas of Conservation (SACs), the Dorset Heaths SAC, the Dorset Heaths (Purbeck & Wareham) and Studland Dunes SAC which are designated for a range of habitats and species. The heaths are also listed as a Ramsar site. The qualifying features for the SPA, SACs and Ramsar are summarised in Appendix 1, which also provides links to the conservation objectives for each site. The sites are also underpinned by national level wildlife designations,

as Sites of Special Scientific Interest (SSSIs) – with the above European sites being comprised of over 40 SSSIs, representing different heathland patches (Map 2).

Urban effects and the Dorset Heaths

1.5 The general (global) impacts of development on wildlife sites are well documented (e.g. Mcdonald, Kareiva & Forman 2008; Mcdonald et al. 2009). The impacts of residential development on heathlands in the UK, and in particular on the Dorset Heaths, have been the subject of a range of studies and have been reviewed by Haskins (2000) and Underhill-Day (2005). The Dorset Heaths have become heavily fragmented, and many sites are surrounded by housing and urban development, particularly in and around the conurbation of Bournemouth, Christchurch and Poole.

1.6 The issues are summarised in Table 1 and Appendix 2 provides a timeline of some of the key studies relating to Dorset. Urban effects relate to development close to the European site boundary and is an umbrella term relating to impacts such as light, noise, cat predation, fly tipping, spread of invasive species (e.g. from gardens and garden waste) and vandalism. Most heathland sites have a legal right of public access, and the heaths draw visitors for a range of activities. Recreation use is associated with impacts such as disturbance, trampling and contamination. Heaths are also vulnerable to fires, which can be triggered by recreation use (barbeques etc.), as well as arson and from adjacent land (e.g. gardens).

1.7 Urban effects and recreation impacts are synergistic and relate to the overall volume of housing. Impacts of development are therefore cumulative, i.e. additional new housing adds to the effect from existing housing. Development in close proximity to the heathland sites is likely to have the greatest impact, but development over a wide area has the potential to give rise to deleterious effects.

Map 1: Boundaries of the relevant heathland SPA, SAC and Ramsar sites within the context of Local Authority boundaries.

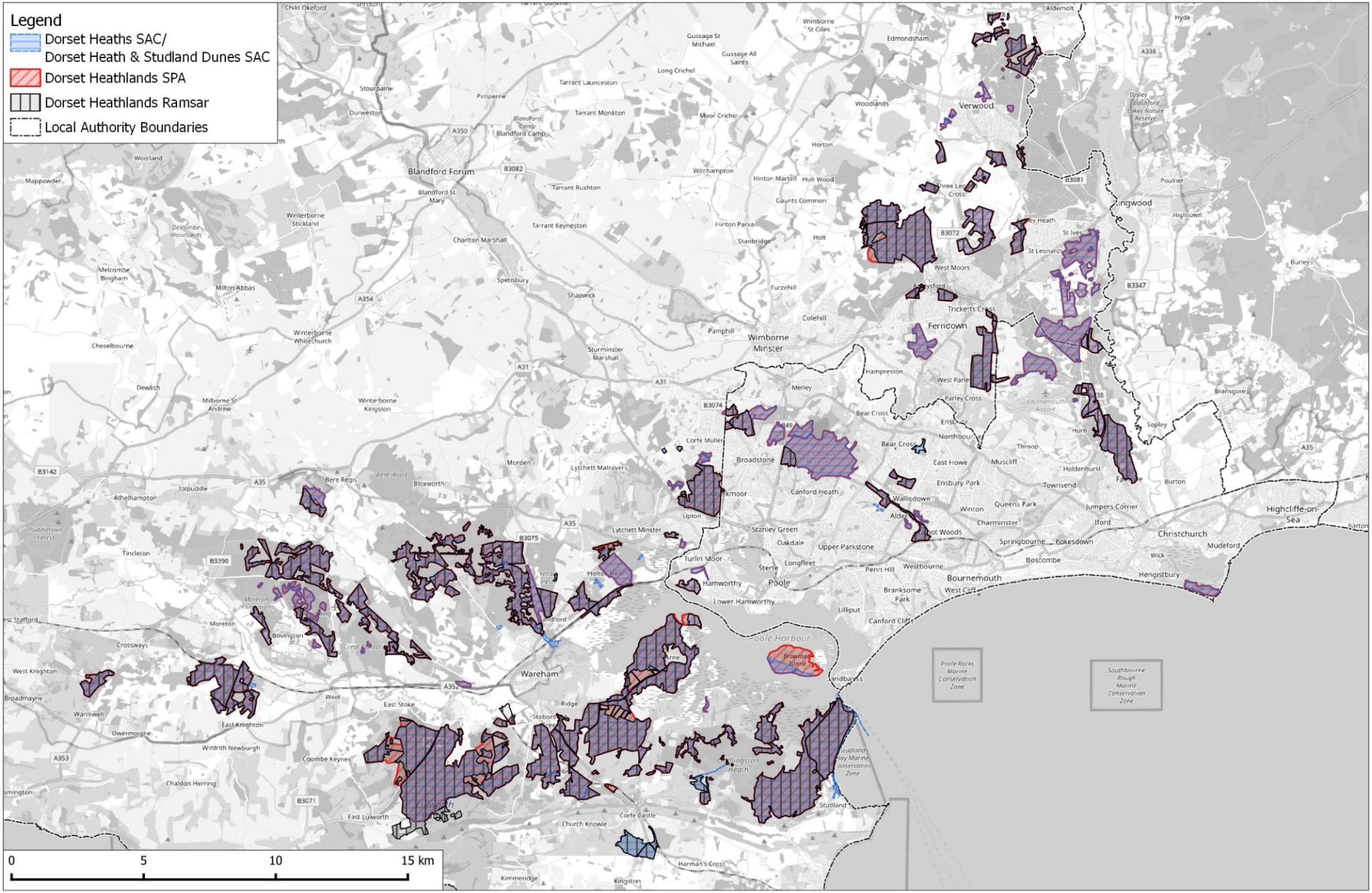


Table 1: The main effects of urban development on lowland heaths in Dorset (adapted from the Dorset Heaths Planning Framework, see Dorset Council and BCP Council, 2020)

Effect	Notes
Reduction in area	Mid 18C *c*36,000ha to 7373ha in 1996 (Rose et al, 2000)
Fragmentation of heaths	Resulted in about 768 fragments, 88% < 10ha (Webb and Haskins, 1980)
Supporting habitats	Less semi-natural habitat adjoining heaths
Predation	Cat predation on ground nesting birds and reptiles
	Increase in urban predators such as foxes, rats, magpies around edge of heath
Disruption to hydrology	Diversion of pre-existing natural water sources away from heathland catchments
	Rapid run-off onto heaths from urban areas
Water quality	Changes in pH of water supplies to heathland
	Enrichment and pollutants from urban run-off
	Pollutants from overflows, spills, accidents
Sand and gravel working with land-fill after use	Mineral working destroying habitat and disrupting hydrology
	Polluted water can leak from landfill
Enrichment	Dog excrement causes vegetation change along sides of paths
	Dumping of garden waste
	Litter from recreational use and road traffic
	Spread of invasive species (eg on clothes or fur)
Roads	Increased fire risk from car thrown cigarettes
	Pollution/enrichment causing vegetation change from vehicles in transport corridor
	Roads forming barriers to species mobility
	Road kills increasing mortality rates (Catchpole and Phillips, 1992)
	Noise and light pollution from traffic
Service infrastructures both over and under heathland	Disturbance during construction and maintenance
	Leakage from underground pipes and sewers
	Changes to heathland hydrology
	Poles providing bird predator look-out posts
Disturbance	Changes in breeding bird and animal distributions (eg Mallord et al, 2007)
	Reduction in breeding success of birds/animals (eg Murison et al, 2007)
Trampling	Changes to vegetation
	Creation of bare areas and subsequent soil erosion
	Damage to bare ground reptile and invertebrate habitats and populations
	Increases in path and track networks
	Damage to archaeological features
Wildfire/arson	Increased frequency of fires (Kirby and Tantram, 1999)
	Long-term vegetation changes
	Increased mortality of heathland animals/birds
	Fragmentation/reduction of habitat on heaths
Vandalism	Damage to signs, fences and other infrastructure
Public affairs	Opposition to management eg tree felling, fencing and grazing
	Pressure from visitors for infrastructure (surfaced paths, cafes etc)
Management costs	Greatly increased management costs on urban heaths

Legislative context and the Dorset Heaths Planning Framework

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

1.9 The Regulations provide strict protection for European sites and this extends to local plans. Regulation 105 *et seq* addresses the assessment of local plans and there is also a Government Guidance on the interpretation and application of the Regulations which includes local plans[2] . The National Planning Policy Framework (NPPF) highlights the importance of recognising the tier of different designations with international sites at the top tier[3] and reflects the protection afforded to them through the Habitats Regulations.

European sites

1.10 'European sites' are the cornerstone of UK nature conservation policy. Each forms part of a 'national network' of sites that are afforded the highest degree of protection in domestic policy and law. They comprise Special Protection Areas (SPA) classified under the 1979 Birds Directive and Special Areas of Conservation (SAC) designated under the 1992 Habitats Directive. As a matter of policy, potential SPAs (pSPAs), possible SACs (pSACs) and those providing formal compensation for losses to European sites, are also given the same protection.

1.11 Together, the network comprises over 275 sites extending over 3,750,000ha[4], and safeguards the most valuable and threatened habitats and species across the country and Europe. Prior to Brexit, this formed part of the EU-wide Natura 2000 network of SPAs and SACs to form the largest, coordinated network of protected areas in the world.

---

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

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

[3] See para 175 and 182 in the NPPF 2021 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

[4] https://jncc.gov.uk/our-work/special-protection-areas-overview/ (accessed 4 March 2021)

1.12 The designations made under the European Directives still apply and the term, 'European site' remains in use. According to long-established Government policy[5], European sites also comprise Ramsar sites although these do not form part of the national network.

1.13 The overarching objectives of the national network are to maintain, or where appropriate, restore habitats and species listed in Annexes I and II of the Habitats Directive to a Favourable Conservation Status, and contribute to ensuring, in their area of distribution, the survival and reproduction of wild birds and securing compliance with the overarching aims of the Wild Birds Directive.

1.14 The appropriate authorities must have regard to the importance of protected sites, coherence of the national site network and threats of degradation or destruction (including deterioration and disturbance of protected features) on SPAs and SACs.

The Dorset Heaths Planning Framework

1.15 The issues of urban effects have long been recognised on the Dorset Heaths (De Molinaar, 1998; Haskins, 2000; Liley et al., 2007) and given the strict legal protection afforded to the Heaths, local planning authorities have established a strategic approach to mitigating the effects of development in order to allow housing growth around the Dorset Heaths to continue, while ensuring compliance with the relevant legislation.

1.16 The strategic approach to avoidance and mitigation for urban effects in Dorset was established in 2007, when local authorities within 5km of the heaths set out a joint approach that has subsequently been revised and updated. The current iteration, set out in a joint supplementary planning document, (the Dorset Heaths Planning Framework) covers the period 2020-25 (Dorset Council and BCP Council, 2020)[6].

1.17 The strategy consists of two mutually dependent and supporting policy mechanisms:

- Restrictions on development within 400m of heathland; and
- Mitigation for particular types of development within 400m – 5km of heathland, involving:
  1. **Strategic Access Management and Monitoring (SAMM); and**
  2. **Heathland Infrastructure Projects (HIPs), which include Suitable Alternative Natural Greenspace (SANG).**

[5] ODPM Circular 06/2005: Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System (16 August 2005), to be read in conjunction with the current NPPF, other Government guidance and the current version of the Habitats Regulations.
[6] See relevant page on Dorset Council website for details

1.18 SAMM involves awareness raising, education and wardening as well as monitoring and has been overseen by the Urban Heaths Partnership (UHP). HIPs cover physical infrastructure, such as enhancing existing greenspace or creating new spaces, targeted for recreation. These avoidance and mitigation measures are therefore designed to resolve issues associated with urban effects and recreation. Full details of how the various measures are established and implemented are set out in the SPD. The 400m and 5km zones are shown in Map 2. These are the mapped zones as provided by Dorset Council and as shown on the Dorset Explorer website at the time of writing.

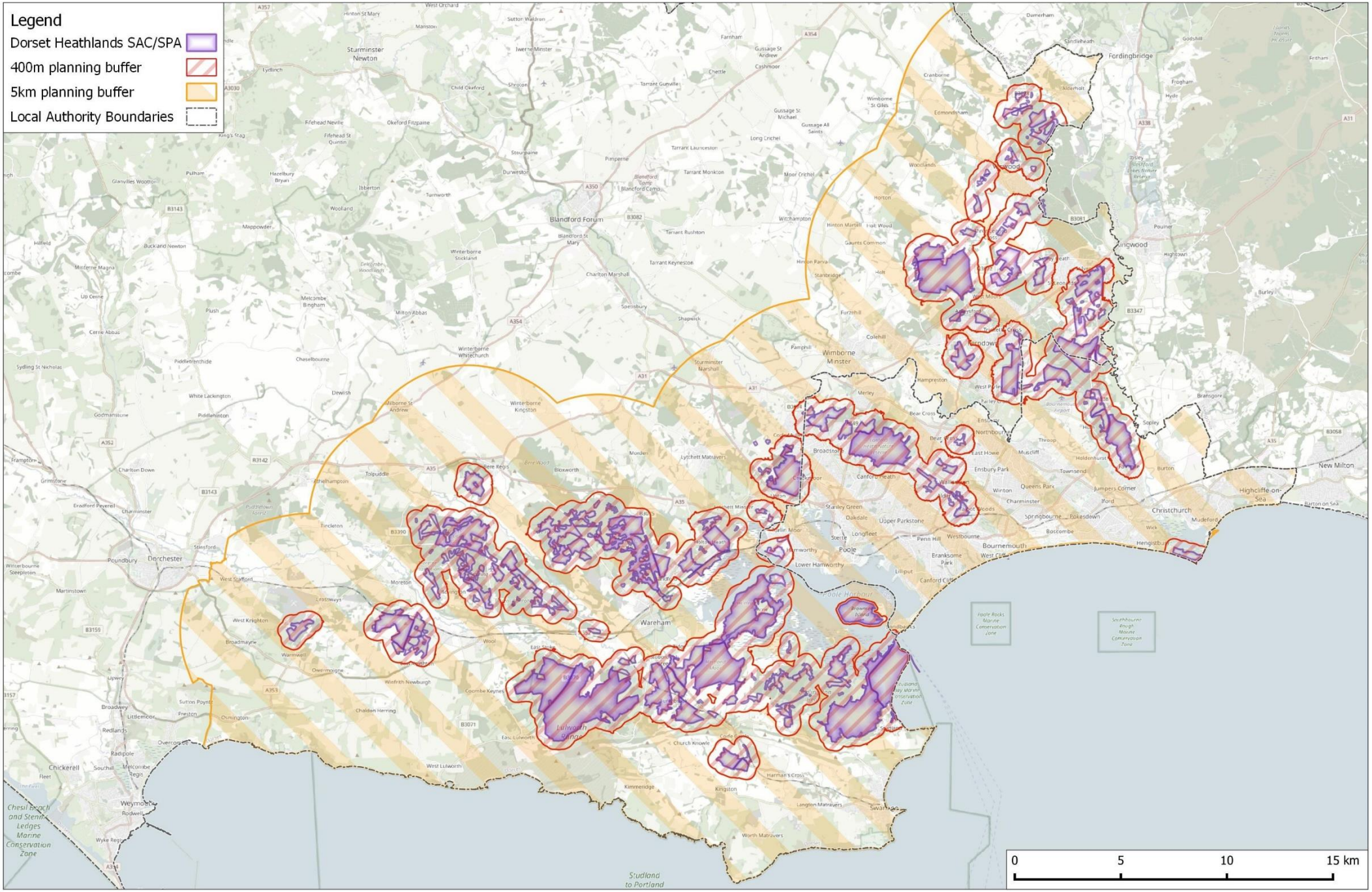
The need for this report

1.19 The strategic mitigation approach has therefore been running for 15 years. Regular monitoring and survey work has been undertaken over this period and a range of data are available, for example relating to visitor use or bird trends. These data have been summarised in a series of annual reports commissioned by UHP. While these reports provide useful information to inform and help target SAMM, the data have to date not been combined more strategically, for example to check how changes in visitor numbers relate to housing growth. Following reorganisation of local government in 2019, there are now two local planning authorities within the 5km zone, BCP and Dorset. These two councils have commissioned this report to provide the evidence to inform future policy in their emerging local plans and to underpin the next iteration of the Dorset Heaths Planning Framework.

Report structure

1.20 The subsequent section (Section 2) of the report summarises the data sources and methods and then reviews the mitigation delivery and effectiveness to date. The section is split into a series of questions set by the Councils. The third part of the report considers the future, summarising the potential levels of housing growth likely to come forward around the Dorset Heaths and the mitigation requirements.

Map 2 : Dorset Heathlands 400m and 5km planning buffers provided by Dorset Council (© Dorset Council).



2. Review of mitigation delivery and effectiveness to date

Data sources and approach used in part 2

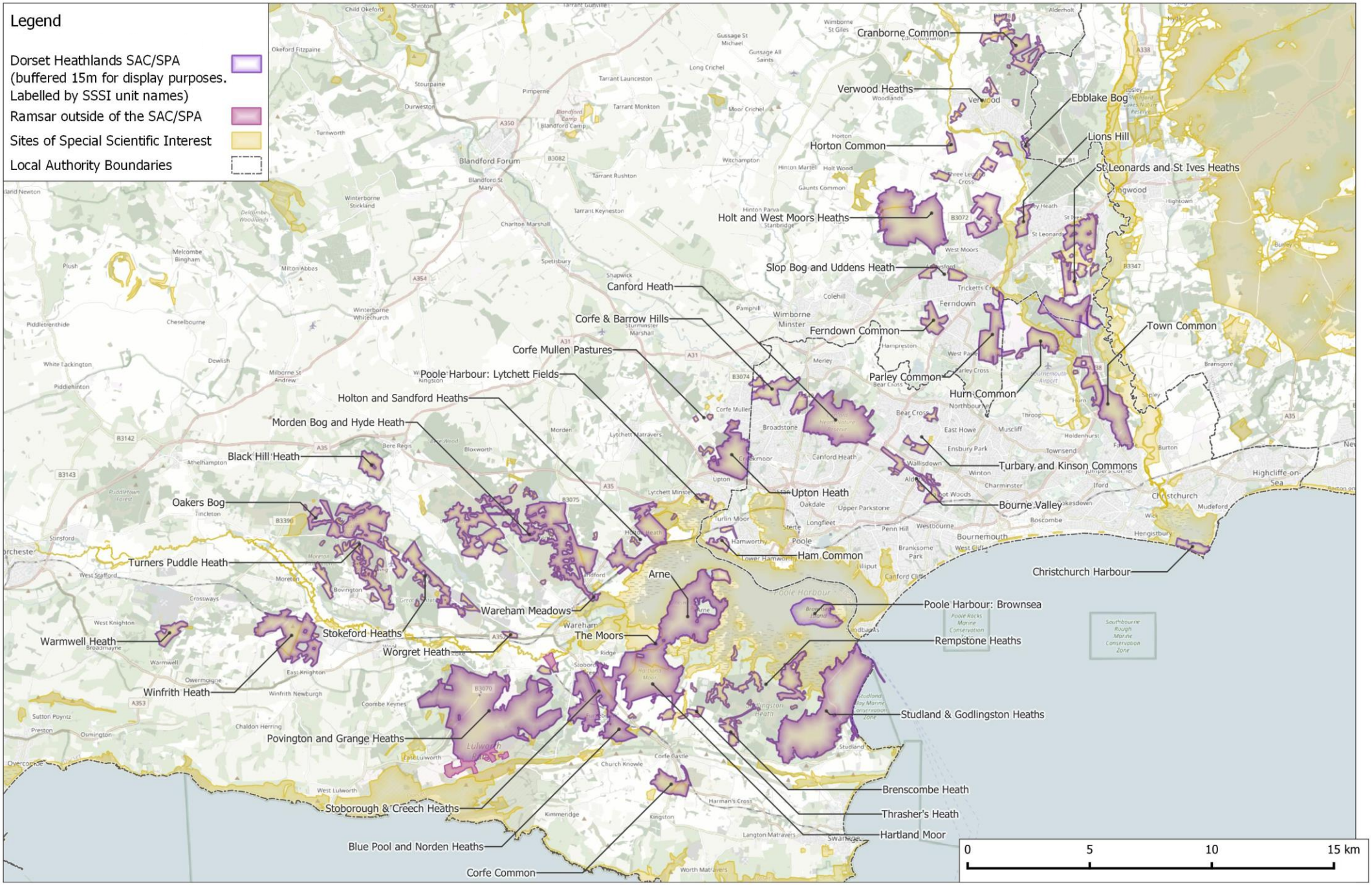
2.1 This section sets out the data used and our approach. Much of the data used are described in detail in the annual monitoring reports produced for UHP and these provide additional detail and background.

2.2 The data are complex as we potentially are looking to compare ecological data with a range of other variables, all collected at a range of spatial scales and in different ways. In order to compare change over time – whether in birds, housing, visitor numbers or fire incidence – we use the ratio of average from the first 3 years (e.g. 2007-10) compared to the average from the more recent 3 years (2017-2020). In some cases, the years used to calculate the averages were varied. The ratio gives a level of change and this can be calculated at a site basis or at a Dorset Heaths level. It allows us to compare sites and between metrics (e.g. has the increase in housing matched the increase in visitors).

Sites

2.3 The boundaries for the European sites and component SSSIs are complex, with various overlapping designations. We use 'Dorset Heaths' to describe the entire area of the Heaths, encompassing the 2 Dorset Heaths SACs and the Dorset Heathlands SPA. In order to compare between different parts of the Dorset Heaths and refer to component parts we use SSSI names and boundaries (cut to the European site boundary, see Map 3), and we split the separate patches of heathland within Poole Harbour SSSI into two sites: 'Poole Harbour: Brownsea Island' and 'Poole Harbour: Lytchett Fields'.

Map 3: Component SSSIs of the Dorset Heathlands SAC/SPA and labelled site names, as used in report.



Housing data (current and levels of development since 2007)

2.4 We have extracted housing data from 3 specific points in time: 2007, 2011 and 2021[7]. The 2007 data are some of the earliest postcode data set held by Footprint Ecology, and coincide with the start year of mitigation. The 2007 data were sourced from National Postcode data and these align the postcodes to a 100m grid. The 2011 and 2021 postcode data are point data representing the centroid for each postcode (to 1m accuracy), with number of residential properties from a reference file that originated from PostZon and code point using Royal Mail Postcode Address File and Ordnance Survey Open data. To align the different datasets, the more recent data 2011 and 2021 datasets were aligned using 100m grid cells to transform the data to a similar resolution as the 2007 data. However, it should be noted that postcode centroids are not fixed locations and some individual postcode areas have changed over time. As such direct comparison of these postcode datasets over time can in a small number of instances result in a negative housing change, especially in rural areas where postcode areas are larger and the centroid can shifted into an adjacent 100m cell.

2.5 We extracted housing levels using the postcode data from different years and 1km buffers drawn around individual heaths and the heaths as a whole. Using such buffers allows us to be able to quantify which heaths have more housing within a given radius. However, we know people who live closer to heaths visit more frequently than those living further away and therefore we generated a weighted housing variable, combining the data from 1km bands and giving a different weighting to each band. The weighting was based on visit rates extracted from the 2019 Dorset Heaths visitor survey data (Panter and Caals, 2020a), which collected postcode data from 23 different points across the Dorset Heaths (see Panter and Caals, 2020a for details), such that:

$$Ratek = Gjk / Ujk$$

Where:

Gk = number of geo-referenced visitors from distance band k from survey point j

Uk = number of dwellings in distance band k from survey point j

2.6 The estimates of average visitor rates per distance buffer (Figure 1) provided the weights to calculate a weighted sum of the number of dwellings in each buffer; the sum representing a measure of housing pressure Hi for boundary i, namely:

[7] Postcode datasets provided by XYZ Maps (2007), BHP Data (2011) and Nelson Marketing (2021).

H_i = sum of ($Rate_k$ x U_{ik})

where U_{ik} = number of dwellings in distance band k from boundary,

and the summation is over all distance bands

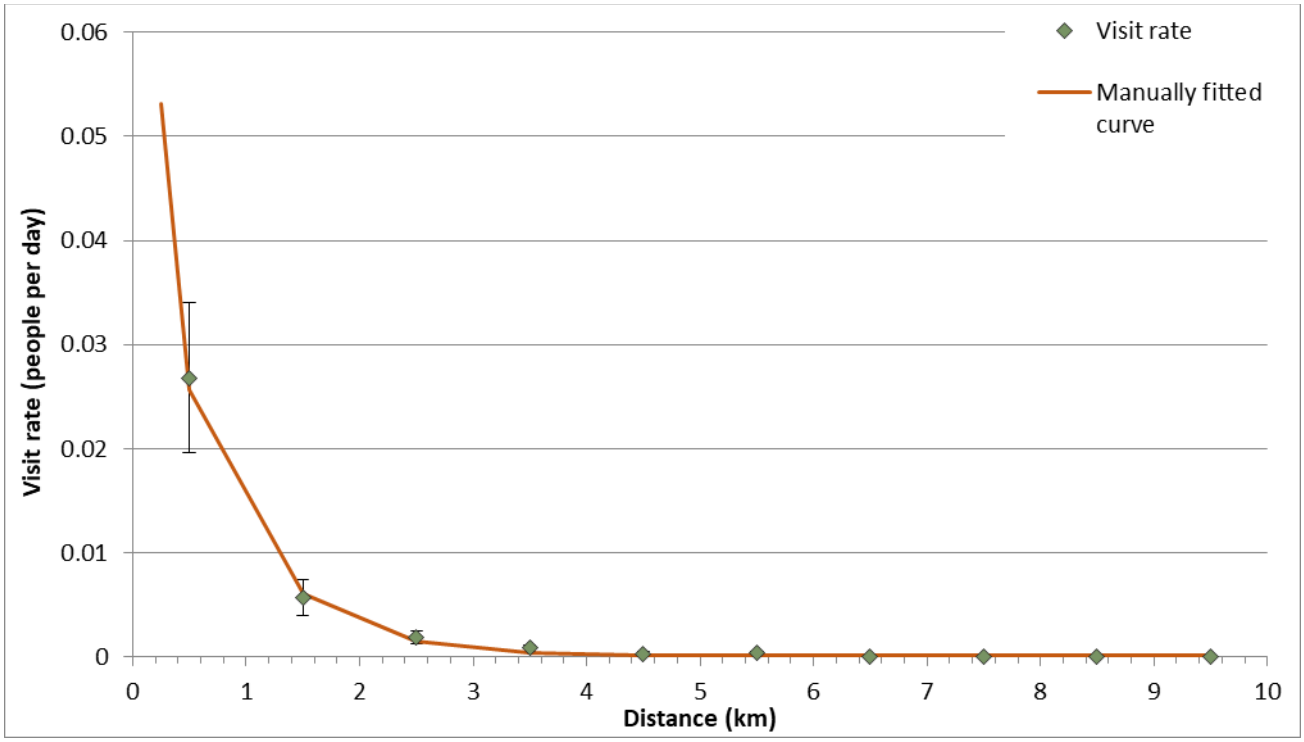


Figure 1: Mean visit rate (with Standard Error shown from across the 23 survey points). The manually fitted curve (r^2 =0.998) was used to create a weighted housing metric.

UHP annual data

2.7 Data from vehicle counts at parking locations and automated people counters across the area have been provided by UHP to Footprint Ecology on an annual basis to produce annual monitoring reports for each financial year. These annual reports summarise the data from each year and provide information for UHP to assist in targeting mitigation delivery in the subsequent year. Annual monitoring data include vehicle counts, automated sensors, incident reporting and bird monitoring (the later undertaken by the RSPB).

2.8 The data from sensors and car parks cover a wide range of locations, including SANGs and therefore are not solely restricted to heaths. Sensors and parking locations are categorised to allow particular types of sites to be compared. A wide range of categories are recognised, including 3 related to the heaths:

- Heaths: the core heath, where visitors are likely only to be using the heath and not drawn for other reasons (such as presence of café, visitor centre or access to other features such as coast or estuary);
- Heath+: locations where there is access to other habitats or features that mean the site is particularly attractive or has a particular draw, for example sites such as Studland or Hengistbury where there is access to the beach or Poole Harbour;
- Heath VS: heath visitor sites where there are particular attractions and visitor engagement in place, for example sites such as Arne RSPB or Avon Heath Country Park where there are cafés and other visitor facilities.

Vehicle counts

2.9 Vehicle counts commenced in 2008-09 and involve standardised transects with a team of people driving set routes and counting all parked vehicles in pre-determined parking locations along the route. The approach is summarised in the annual monitoring reports produced for UHP (e.g. Panter and Caals, 2020b) and the counts involve virtually all parking locations (encompassing large formal car parks and small informal parking locations such as lay bys) across the Dorset Heaths. Data from 2008-09 and 2009-10 were not used in analysis within this report since it took a few years for a standardised method to become established that allowed direct comparison between years.

2.10 Ratios comparing change over time were calculated using data from 2010-2013 and 2017-2020. The final count of the financial year 2019-20 could not take place due to the coronavirus pandemic but there were sufficient data in the previous 2 years to take an average and therefore the missing count did not have any significant effect. To compare like with like, the average (mean) number of vehicles counted on each transect number was calculated for each parking location and then aggregated across the year and by SSSI. Some SSSIs are not included, either because no parking locations were associated with them or because there were insufficient data to make a comparison e.g. Arne.

Sensor data

2.11 Automated sensors, also referred to as automated counters, are electronic loggers placed on a path, either in the ground or in gate posts etc., to record people passing. The sensors are recording movement past a light sensitive device (for pyroelectric Infra Red sensors or “pyros”) or record the increase in weight on a path (for pressure pad sensors). A total of 134 specific sensors locations have been used, starting in 2007 and amounts to almost 737 years of potential recording (considering first and last data dates, as of August 2020). However, the sensors were installed at various points in time and have ceased at several points due to repairs, vandalism and other damage.

2.12 All sensors provide hourly data in the form of a figure of the number of 'passes'. The record of the number of passes is subject to error from a range of sources, for example; related to how effective the sensor is (including its placement and ability to log passes) and interference from other environmental factors (i.e. light and vegetation for pyro sensors and water logging or path erosion for pressure pads. Sensors require calibration, involving direct observation, to check how the number of 'passes' on the sensor relates to the number of people passing and the direction that people pass. Not all sensors have been recently calibrated and this causes some challenges with interpreting the data.

2.13 Data are manually cleaned by examining daily data for exceptionally large or small values, outside the typical patterns for a sensor. Any days with these erroneous data are removed, alongside the day of a sensor change – the point at which when the sensor is physically examined, data storage device swapped and sensor tested (roughly every 6 months). The individual sensors vary in their start and end dates and suffer issues with incomplete data. Within these data there are also often errors (e.g. unusual counts) and the whole dataset was checked for obvious erroneous data. This preliminary cleaning is automated and removes extremely large values. The final dataset gives overs 220,000 sensor days with a value.

2.14 The mean number of days of data collected by a sensor was 1,676 (equivalent to roughly 33% of the days between start of 2007 and end of 2020). Table 26 along with Figure 31 in Appendix 3 shows the completeness of the dataset, by month and highlights the patchy data. As such we checked for specific times of year when the data were more complete to examine specific weeks/months over time. The mean start date was May 2011. Some sensors have relatively short data stints, as they deployed for specific short-term projects while others have been removed due to data logging issues and effectiveness of the recording. Also, the sensor network was rationalised around 2016 to provide a smaller, more manageable sample. 52 sensors were in place in 2021 and the average duration of a sensor was 5.4 years with 23 sensors installed for more than 10 years.

2.15 Our analysis of the long-term trend used the first three years and last three years and is based on the average number of passes per hour for each day, for each sensor. We then compared blocks of data to explore changes over time. We used complete weekly values to reduce the impact of variability between the contribution of weekdays and weekends. For the ratios we selected data from weeks 20 to 30 of the calendar year (as these were months with the most valid data). We compared an average for the 3 years; 2007, 2008 and 2009 to an average for the last 3 complete years; 2017, 2018, 2019. This provided a value for 32 sensors from which to calculate ratios. For more detailed examination of change over time we selected a smaller subset of weeks of 8 to 12 of the calendar year and used average hourly figures for complete weeks over time.

Incident and fire reporting

2.16 Incidents on the heaths are logged by wardens, and include small scale fires. The rest of the data on fires comes from logged call outs by Dorset and Wiltshire Fire and Rescue. An area of heathland burnt is recorded with each fire and its location mapped providing a reliable record.

Bird data

2.17 Annual survey data for the three SPA qualifying species from the Dorset Heath SSSI network were provided by the RSPB, covering the period 2006 to 2019 for Dartford Warbler and Woodlark, and 2009 to 2019 for Nightjar. It should be noted that the level of survey effort at both a species and site level varied from year to year, and that some larger SSSIs were only ever partially surveyed.

2.18 Data in the early years were collected at a 'site' level, with the number of territories provided per heath, in the form of a spreadsheet with totals and a site name. The approach was revised slightly in 2014 in an effort to ensure consistency across years, to ensure there were clear boundaries as to the areas surveyed and to allow part coverage of large sites (such as Wareham Forest) thereby ensuring survey work was feasible and cost effective on an annual basis. The revised approach centred around core 1km squares that were mapped and these surveyed on an annual basis. Territories were subsequently mapped within these core squares. Incidental recording of any territories just outside the core squares meant that data were still available at a 'site' or heath basis yet the core squares approach provide a more reliable long-term data set. The core squares have not been used in the analysis presented here, for further details and maps of the core squares, see the annual UHP monitoring reports.

HIP/SANG survey data

2.19 HIPs, including SANGs can be delivered in a range of ways and take a range of forms. For example, SANGs can be delivered by developers and mitigate a specific development through the provision of greenspace as part of that development site or SANGs can be strategic, delivered by the local authority in a central location and providing mitigation for numerous small sites across a wide area.

2.20 Visitor monitoring at SANGs delivered by developers is expected to take place before opening (if there is already public access), on opening (once all works are completed or major phases are completed) and subsequently twice more, at around 2/3 years after opening and 5 years after opening[8]. For strategic SANGs,

[8] See Appendix of the Dorset Heathlands Planning Framework for details

monitoring has been undertaken by the local authority/UHP and survey data were provided by UHP and Councils (see Table 2).

Table 2: Summary of visitor survey data available by year and site

Year from opening	Pre-works (if existing access)	On opening (post works)	Second Round	Third Round
	-1	0	2/3	5
Potterne HIP			2012	
BytheWay SANG		2012/13		2017/18
Woolslope SANG	2012/13	2013/14		
Upton Country Park P1 SANG		2015	2018	
Stanpit Recreation Ground HIP	2012		2016	*evolved into SANG*
Bog Lane SANG		2017		
Upton Country Park P2 SANG		2018		
Frenches Farm SANG		2018		
Canford Park SANG		2019		
Riversmeet & Stanpit SANG	*previous HIP surveys*	2019		
Iford Meadows & Playing Field HIP		2019		
Leigh Road (aka Stourview) SANG	2018			

Questions set by the Councils

2.21 A set of questions were posed by the Councils and form the structure for the rest of this part of the report. The questions are set out below, with hyperlinks to the relevant part of the document:

Housing

1. **How has the amount of housing changed in the period 2007-2020 (totals and distribution)?**

SAMM Mitigation delivery

2. **What is the sum total (i.e. in terms of cost, staff hours etc.) of mitigation delivery since 2007?**
3. **Where has mitigation delivery (SAMM wardening) taken place?**
4. **How effective has the Dorset Dogs mitigation project been (e.g. review of member postcodes, membership over time etc)?**
5. **How effective have other mitigation projects been? (e.g. school engagement and community projects such as Firewise)?**
6. **What is the level of wardening since 2007 and what is the optimum deployment?**

Heathland Infrastructure Projects (HIPs)

7. **What is the overall level of HIPs mitigation delivery?**
8. **What are the catchments of SANGs and how do these compare to heaths?**
9. **How do SANGs as a network relate to distribution of recent housing (extent and distribution)?**
10. **How do numbers of people on SANGs relate to housing change (totals and distribution)?**
11. **What is the distribution of the existing HIPs/SANGs network?**
12. **How does the visitor profile on SANGs compare to heaths?**
13. **Are there notable differences between SANGs, with regards to capacity, effectiveness etc?**

Heathland visitors

14. **How have heath visitor numbers changed (totals and distribution)?**
15. **Where are heath visitors coming from and what gaps in distribution of visitors are indicated from interviewee postcode data?**
16. **How does the distribution of change in heath visitor numbers relate to housing change and SANG proximity?**

Incident reporting on heathlands

17. **How have numbers of incidents (fires) changed (total number, extent and distribution)?**

18. **How do changes in spatial distribution of incidents relate to changes in distribution of housing numbers, visitor numbers, SANG locations and education?**

Birds

19. **How have SPA bird numbers changed (totals, density and distribution)?**
20. **How do changes in spatial distribution of birds (e.g. site totals) relate to changes in distribution of housing and visitor numbers?**

How has the amount of housing changed in the period 2007-2020?

Overall housing change around the Dorset Heaths

2.22 Within a 5km radius of the Dorset Heaths there are currently[9] a total of 266,392 dwellings and 312,370 within a 10km radius (see Figure 2 and Table 3)[10]. These totals represent an increase of roughly 6.4% and 6.9% respectively when compared with the equivalent housing data from 2007.

2.23 The spatial distribution of this housing change is shown in Map 4, and highlights concentrations of growth in and around existing settlements and some of the largest developments within the core of the conurbation.

2.24 Table 4 summarises housing levels around each component SSSI. Three sites stand out in terms of the volume of housing currently surrounding them: Canford Heath, Turbary & Kinson Commons and Bourne Valley all have more than 100,000 dwellings within a 5km radius. In terms of housing density per ha of heathland Poole Harbour: Lytchett Fields, Corfe Mullen Pastures and Turbary and Kinson Commons are ranked high (all with over 3,000 dwellings per ha of heathland).

2.25 Map 5 and Table 4 show the housing change between 2007 and 2021 by component site and from these data we can single out 4 sites that have seen a level of change of over 5,000 new dwellings within 5km: Canford Heath, Town Common, Turbary & Kinson Commons and Bourne Valley. The sites that have seen the highest percentage increase (in all cases exceeding a 9% increase) are the Rempstone Heaths, Slop Bog & Uddens Heath and Turners Puddle Heath.

[9] As of January 2021

[10] Note all figures are not just for Dorset and BCP and the 10km buffer will extend into Hampshire and Wiltshire.

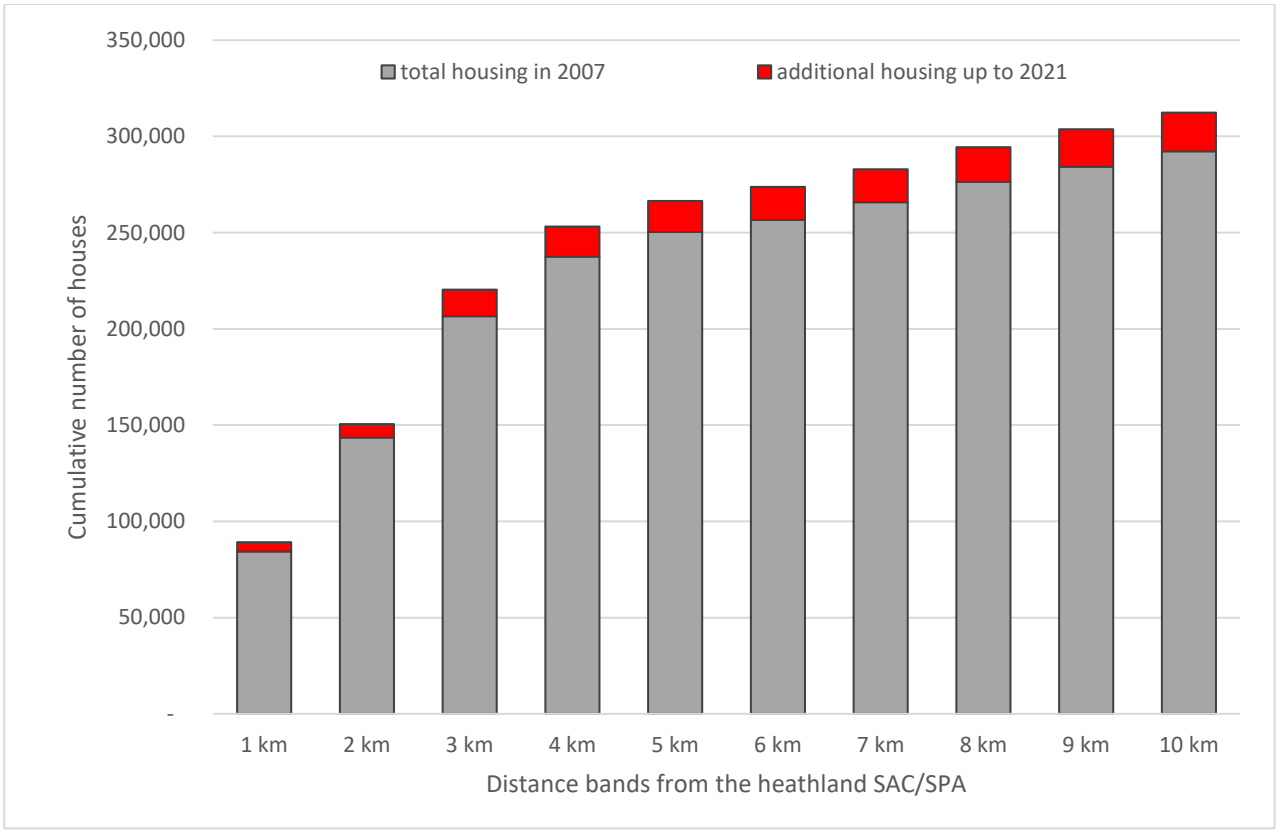


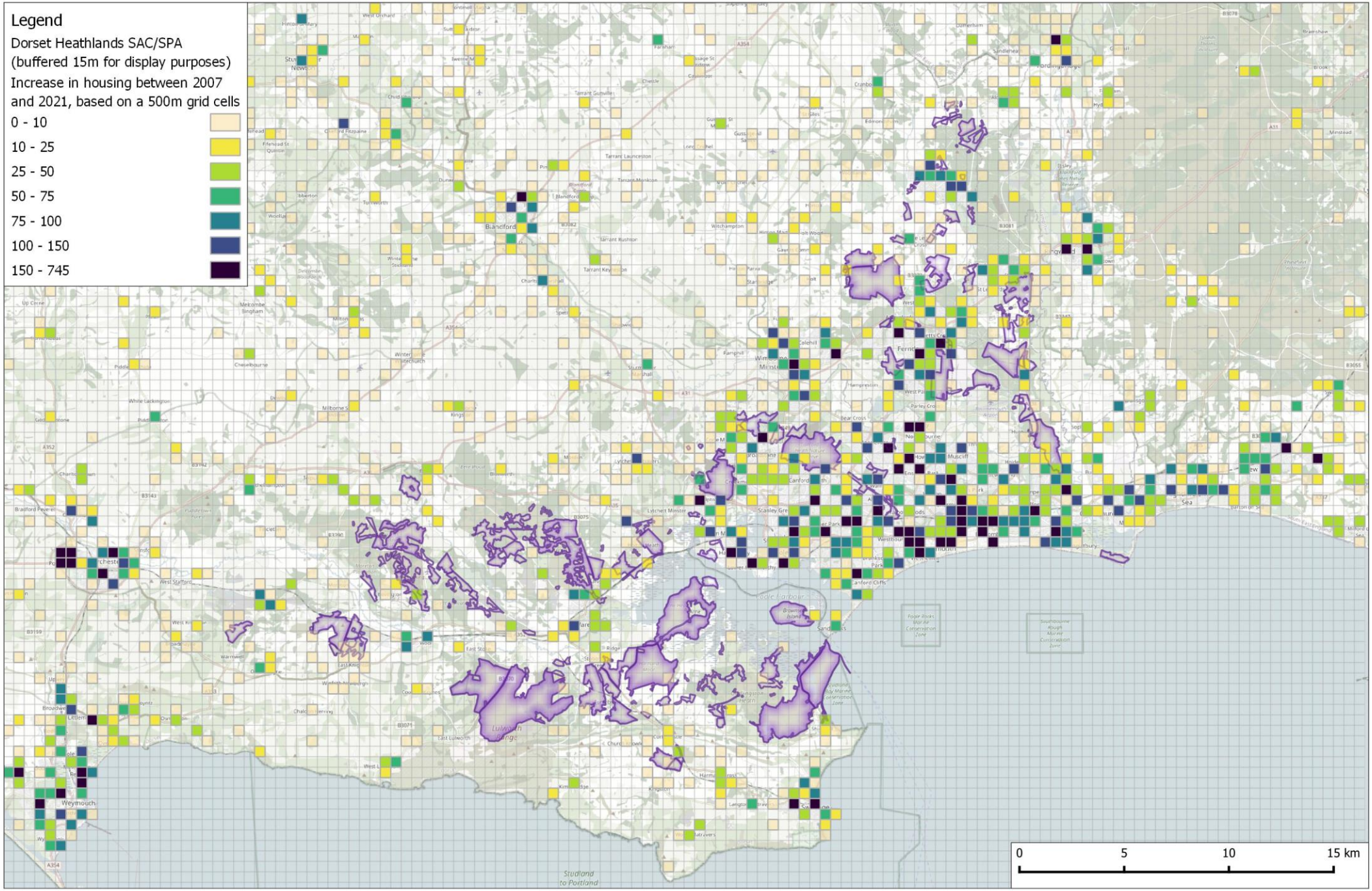
Figure 2: Number of dwellings within 1km distance bands of the Dorset Heaths. Number of dwellings in 2007 is shown in grey and housing growth 2007-2021 in red. Data are cumulative in that the first column relates to 0-1km, the second 0-2km, the third 0-3km etc. .

Table 3: Summary of housing numbers from three dates; 2007, 2011 and 2021 for 1km bands around the Dorset Heaths (buffers drawn around the boundaries of the SPA/SACs). Figures include housing data for local authorities outside of just Dorset and BCP. Change in these housing figures between dates is given for each band. At the 5km and 10km distances, the housing figures are summed.

	Distance band (km)	No. dwellings in 2007*	No. dwellings in 2011	Change in housing between 2007* – 2011	No. dwellings in 2021	Change in housing between 2011 - 2021	Change in housing between 2007* - 2021	% increase in housing between 2007 - 2021
Increased distance away from the heath	0 - 1	84,376	86,049	+1,673	89,249	+3,200	+4,873	5.8%
	1 - 2	59,102	57,719	-1,383	61,311	+3,592	+2,209	3.7%
	2 - 3	63,124	64,744	+1,620	69,791	+5,047	+6,667	10.6%
	3 - 4	30,940	31,600	+660	32,823	+1,223	+1,883	6.1%
	4 - 5	12,725	12,757	+32	13,218	+461	+493	3.9%
	Total within 5km	**250,267**	**252,869**	**+2,602**	**266,392**	**+13,523**	**+16,125**	**6.4%**
	5 - 6	6,455	6,929	+474	7,372	+443	+917	14.2%
	6 - 7	9,101	8,514	-587	9,116	+602	+15	0.2%
	7 - 8	10,705	10,894	+189	11,456	+562	+751	7.0%
	8 - 9	7,767	8,228	+461	9,395	+1,167	+1,628	21.0%
	9 - 10	7,949	8,241	+292	8,639	+398	+690	8.7%
	Total within 10 km	**292,244**	**295,675**	**+3,431**	**312,370**	**+16,695**	**+20,126**	**6.9%**

* Data on number of dwellings in 2007 are based on a 1km grid and postcodes are therefore less likely to line up with more recent, more accurate data, therefore change in these are less accurate. The change figures are least reliable in the smaller distance bands as they cover a small area.

Map 4: Housing change between 2007 and 2021, based on a 500m grid.



Map 5: Housing change 2007-2021 within a 5km radius of sites. Shading shows additional houses within 5km and red labels give percentage change.

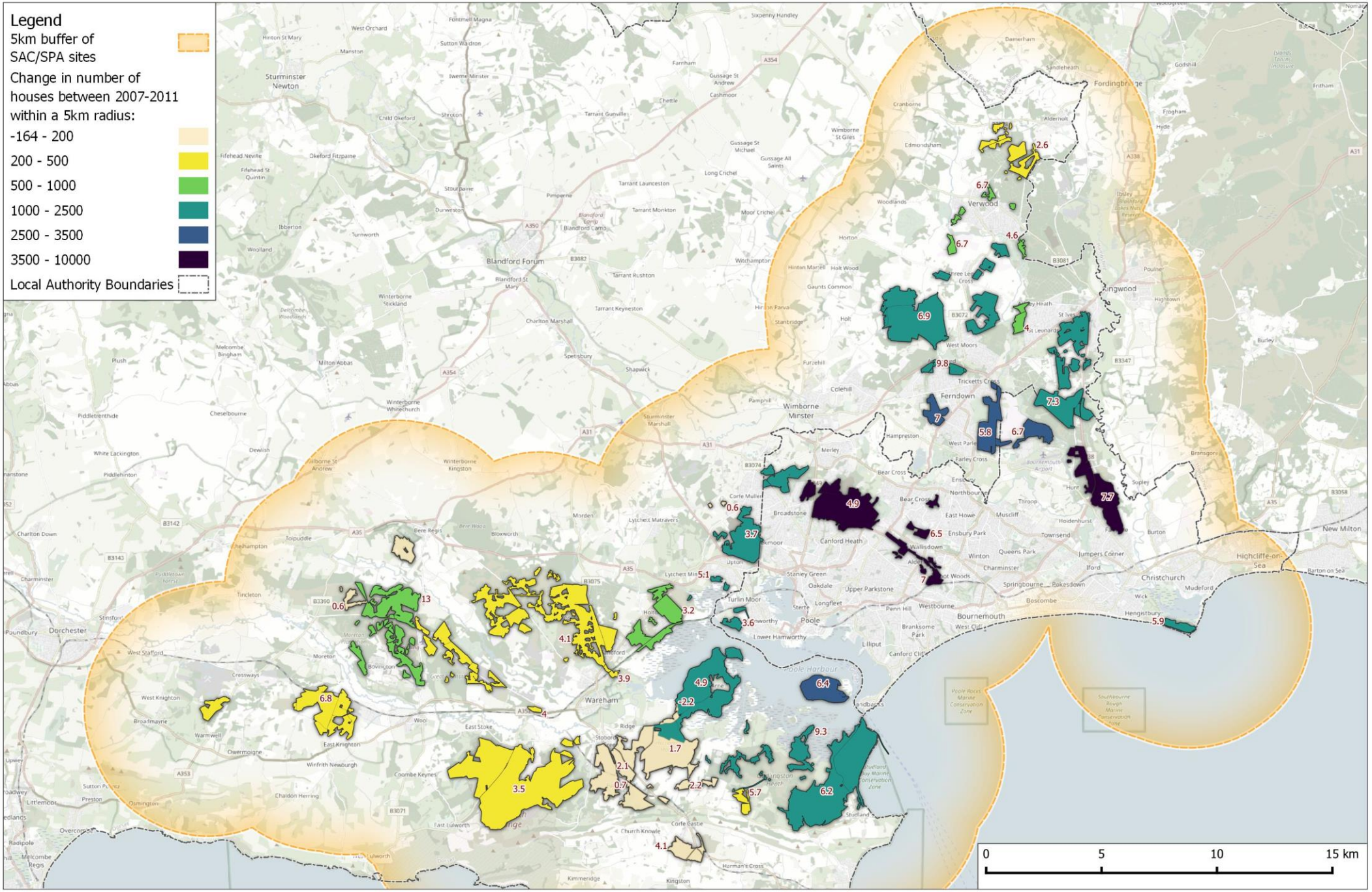


Table 4: Housing change between 2007 and 2021 for different component SSSIs. Data rows sorted by an average of the 5km and 10km change.

Component SSSI	Site area (ha)	Current no. dwellings (2021)	Current dwellings (2021) per ha	% increase in housing between 2007-21	housing between 2007-21	housing between 2007-21 per ha
Arne	518.4	29,869	57.6	4.9%	1392	2.7
Black Hill Heath	70.6	2,932	41.5	3.3%	95	1.3
Blue Pool and Norden Heaths	92.7	4,683	50.5	0.7%	34	0.4
Bourne Valley	72.8	134,910	1852.0	7.0%	8777	120.5
Brenscombe Heath	34.8	3,729	107.2	5.7%	202	5.8
Canford Heath	408.9	113,984	278.7	4.9%	5304	13.0
Christchurch Harbour	36.2	40,137	1109.8	5.9%	2227	61.6
Corfe & Barrow Hills	102.2	50,443	493.8	4.7%	2277	22.3
Corfe Common	91.1	2,329	25.6	4.1%	92	1.0
Corfe Mullen Pastures	4.5	28,023	6161.1	0.6%	169	37.2
Cranborne Common	134.1	11,833	88.2	2.6%	298	2.2
Ebblake Bog	11.3	16,618	1469.3	4.6%	734	64.9
Ferndown Common	64.5	44,616	692.0	7.0%	2904	45.0
Ham Common	33.0	41,103	1246.3	3.6%	1418	43.0
Hartland Moor	302.0	5,934	19.7	1.7%	97	0.3
Holt and West Moors Heaths	686.6	33,802	49.2	6.9%	2170	3.2
Holton and Sandford Heaths	201.7	21,429	106.3	3.2%	667	3.3
Horton Common	17.6	12,771	726.3	6.7%	803	45.7
Hurn Common	82.3	49,394	599.9	6.7%	3098	37.6
Lions Hill	43.1	24,954	578.6	4.0%	964	22.4
Morden Bog and Hyde Heath	655.2	10,745	16.4	4.1%	421	0.6
Oakers Bog	29.8	2,646	88.7	0.6%	15	0.5
Parley Common	163.4	58,236	356.5	5.8%	3209	19.6
Poole Harbour: Brownsea	161.6	42,986	265.9	6.4%	2599	16.1
Poole Harbour: Lytchett Fields	13.0	40,267	3088.1	5.1%	1966	150.8
Povington and Grange Heaths	1123.4	7,687	6.8	3.5%	262	0.2
Rempstone Heaths	166.2	18,060	108.7	9.3%	1539	9.3
Slop Bog and Uddens Heath	38.2	26,399	691.8	9.8%	2355	61.7
St Leonards and St Ives Heaths	412.2	35,714	86.6	7.3%	2434	5.9
Stoborough & Creech Heaths	334.1	5,912	17.7	2.1%	121	0.4
Stokeford Heaths	175.1	7,421	42.4	3.4%	246	1.4
Studland & Godlingston Heaths	755.8	25,221	33.4	6.2%	1479	2.0
The Moors	20.1	7,415	369.2	-2.2%	-164	-8.2
Thrasher's Heath	13.5	1,740	129.0	2.2%	37	2.7
Town Common	257.1	75,432	293.4	7.7%	5380	20.9

Component SSSI	Site area (ha)	Current no. dwellings (2021)	Current dwellings (2021) per ha	% increase in housing between 2007-21	housing between 2007-21	housing between 2007-21 per ha
Turbary and Kinson Commons	33.4	121,049	3628.9	6.5%	7419	222.4
Turners Puddle Heath	393.1	5,591	14.2	13.0%	645	1.6
Upton Heath	220.1	54,979	249.8	3.7%	1955	8.9
Verwood Heaths	27.4	11,241	410.0	6.7%	706	25.7
Wareham Meadows	7.1	5,381	758.3	3.9%	202	28.5
Warmwell Heath	53.3	3,212	60.3	7.5%	223	4.2
Winfrith Heath	289.1	4,540	15.7	6.8%	291	1.0
Worgret Heath	8.5	5,454	644.9	4.0%	208	24.6

Weighted housing variable

2.27 The weighted housing variable uses visit rate to weight houses in close proximity more than those further away. The weighted housing variable is likely to provide a better indication of how visitor levels might change. Data are summarised in Table 5 and change is shown in Map 6. Across all sites the overall percentage increase in weighted housing was 4.5%.

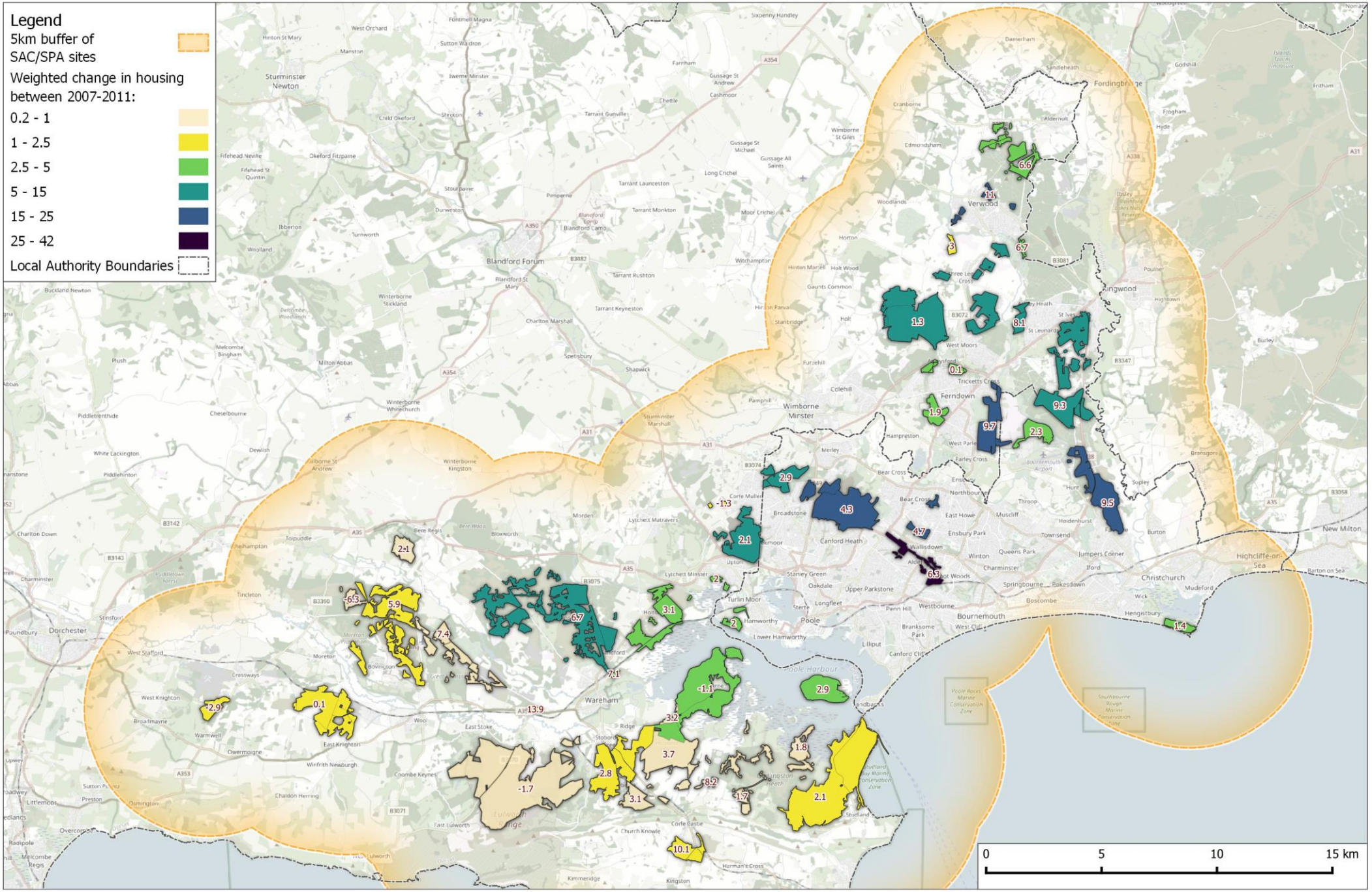
2.28 At an individual site level, the mean % increase in the weighted housing variable over the period 2007-2021 is 3.9%. Bourne Valley is the site with the most change, due to the high density of housing in close proximity. The highest percentage increase in weighted housing was recorded for Worgret Heath, due to this being a very small site (therefore a smaller buffer area) in a very rural area which has experienced some new housing in close proximity. Other sites with a percentage increase over 10% were Corfe Common and Verwood Heaths, followed by St Leonards and St Ives Heaths, Town Common and Parley Common – all over a 9% increase.

Table 5: Weighted housing values for component SSSIs.

Component SSSI	Site area (ha)	Current weighted housing metric (2021)	% change in weighted houses from 2007 to 2021
Arne	518.4	57.0	- 1.08
Black Hill Heath	70.6	21.4	2.09
Blue Pool and Norden Heaths	92.7	11.6	3.08
Bourne Valley	72.8	703.9	6.34

Component SSSI	Site area (ha)	Current weighted housing metric (2021)	% change in weighted houses from 2007 to 2021
Brenscombe Heath	34.8	7.6	1.66
Canford Heath	408.9	468.7	4.29
Christchurch Harbour	36.2	65.0	1.44
Corfe & Barrow Hills	102.2	229.0	2.85
Corfe Common	91.1	19.5	10.08
Corfe Mullen Pastures	4.5	76.5	- 1.26
Cranborne Common	134.1	38.4	6.55
Ebblake Bog	11.3	60.7	6.73
Ferndown Common	64.5	206.1	1.94
Ham Common	33.0	176.7	1.95
Hartland Moor	302.0	15.5	3.70
Holt and West Moors Heaths	686.6	210.6	1.34
Holton and Sandford Heaths	201.7	60.5	3.13
Horton Common	17.6	44.8	3.03
Hurn Common	82.3	52.0	2.27
Lions Hill	43.1	78.7	8.11
Morden Bog and Hyde Heath	655.2	80.6	6.72
Oakers Bog	29.8	5.6	- 6.25
Parley Common	163.4	228.7	9.72
Poole Harbour: Brownsea	161.6	62.6	2.86
Poole Harbour: Lytchett Fields	13.0	154.9	2.00
Povington and Grange Heaths	1123.4	24.7	- 1.68
Rempstone Heaths	166.2	18.3	1.78
Slop Bog and Uddens Heath	38.2	182.0	0.13
St Leonards and St Ives Heaths	412.2	117.9	9.34
Stoborough & Creech Heaths	334.1	33.5	2.76
Stokeford Heaths	175.1	14.4	7.36
Studland & Godlingston Heaths	755.8	46.4	2.09
The Moors	20.1	10.7	3.21
Thrasher's Heath	13.5	6.7	8.20
Town Common	257.1	189.1	9.51
Turbary and Kinson Commons	33.4	510.8	4.67
Turners Puddle Heath	393.1	38.2	5.88
Upton Heath	220.1	332.8	2.09
Verwood Heaths	27.4	149.2	10.95
Wareham Meadows	7.1	63.4	7.05
Warmwell Heath	53.3	20.8	- 2.90
Winfrith Heath	289.1	16.0	0.12
Worgret Heath	8.5	11.0	13.94

Map 6: Weighted housing change between 2007 - 2021. Sites categorised by difference between in weighted values. Percentage increase shown as a labels.



Housing change (2007-2021)

There are presently an estimated 266,392 houses within a 5km radius of the Dorset Heaths, and this volume of housing within the 5km radius has increased by 6.4% since 2007. The percentage increase in housing within very close proximity has been lower, 5.8% within 1km and 4.9% within 2km.

The sites that have had the highest change in housing (based on the weighted housing variable) 2007-2021 are: Worgret Heath (13.94% increase), Verwood Heaths (10.95%), Corfe Common (10.08%), Parley Common (9.72%) and Town Common (9.51%),

What is the sum total of SAMM mitigation delivery since 2007?

2.29 SAMM mitigation delivery has primarily been delivered by UHP (although some wardening has been undertaken directly by local authorities since 2014). Over the period 2007-2020, SAMM has included:

- Education work;
- Dorset Dogs;
- Firewise Communities Project; (involving work to help communities be more resilient to risk of wildfires)
- Wardening;
- Monitoring;
- Other: range of facilitation and partnership working including the Dorset Urban Heaths Grazing Partnership.

2.30 Metrics summarising the delivery of the various mitigation elements are given in Table 6. Relevant data are not necessarily available for all years, but are complete for the most recent year at least. Totals since the start of the mitigation work are impressive, for example over 56,500 school students have attended the various education events, and wardening effort may have exceeded 11,000 hours[11].

[11] This is calculated from the data in Table 6. We assume for 4.6 FTE posts in 2013/14 (and subsequent years) and assume an FTE post is equivalent to around 250 days worked in a year. For the early years the actual days worked are available.

Table 6: Summary of mitigation delivery

	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
No. of students engaged with during UHP schools visits	1900	4617	3678	5500	4142	4335	4590	3823	4108	2927	5217	5942	5786
No. of schools engaged through UHP education activities										20		34	34
People engaged with through events								840	118	0	1680	3100	3290
Attendance at Dorset Dogs Annual Festival (people)									750	2000	2000	2500	3500
Dorset Dogs Pit Stops (No. events)							47	33	33	42	34	38	47
Dorset Dogs Guided Walkies (No. events)									7	22	23	30	35
Number of page views on Dorset Dogs website													52'470
Dorset Dogs membership	N/A	N/A	169	455	666	1004	1102	1448	1665	1843	2000	2302	2357
Followers on Dorset Dogs Facebook												3505	4493
Warden effort (days worked)*	767	534	834	561	490	484							
Warden effort (FTE posts)**								4.6	4.6	4.6	4.6	4.6	4.6
Budget for core UHP team	£324,400	£375,800	£234,020	£248,480	£228,960	£239,458	£244,207	£207,257	£143,524	£145,247	£148,878	£176,904	£203,241

* this is calculated as the total number of hours of warden time (as logged by the staff), including work on school visits etc. and divided by 7.5 to give a value for the number of days. From 2007-2013 all wardens were employed by UHP and time recording data are available. From 2014, wardens have been employed by Local Authority partners and there are no equivalent figures for hours actually worked.

** these totals are the time staff were employed across all local authorities, including 0.5 FTE from West Dorset and hosted by UHP. .

SAMM mitigation delivery

SAMM mitigation has included:

- School visits (around 30 per year, around 5,800 students per year engaged with in recent years);
- A range of events;
- The Firewise Communities Project (involving work to help communities be more resilient to risk of wildfires);
- Dorset Dogs (membership up to around 2,360, annual events, pit stops and guided walk held each year);
- Wardening (around 4.6 Full time equivalent staff per year); and
- Monitoring (including much of data collection used in this report).

Where has mitigation delivery (SAMM wardening) taken place?

2.31 There is no overall data set to show where wardens actually went or any detailed record of how much time has been spent in different locations. Warden time is however directed to particular heaths and the typical level of warden effort – provided by UHP – are summarised in Map 7. The map has been generated by creating a single point for each site covered (see Appendix 4 for data used).

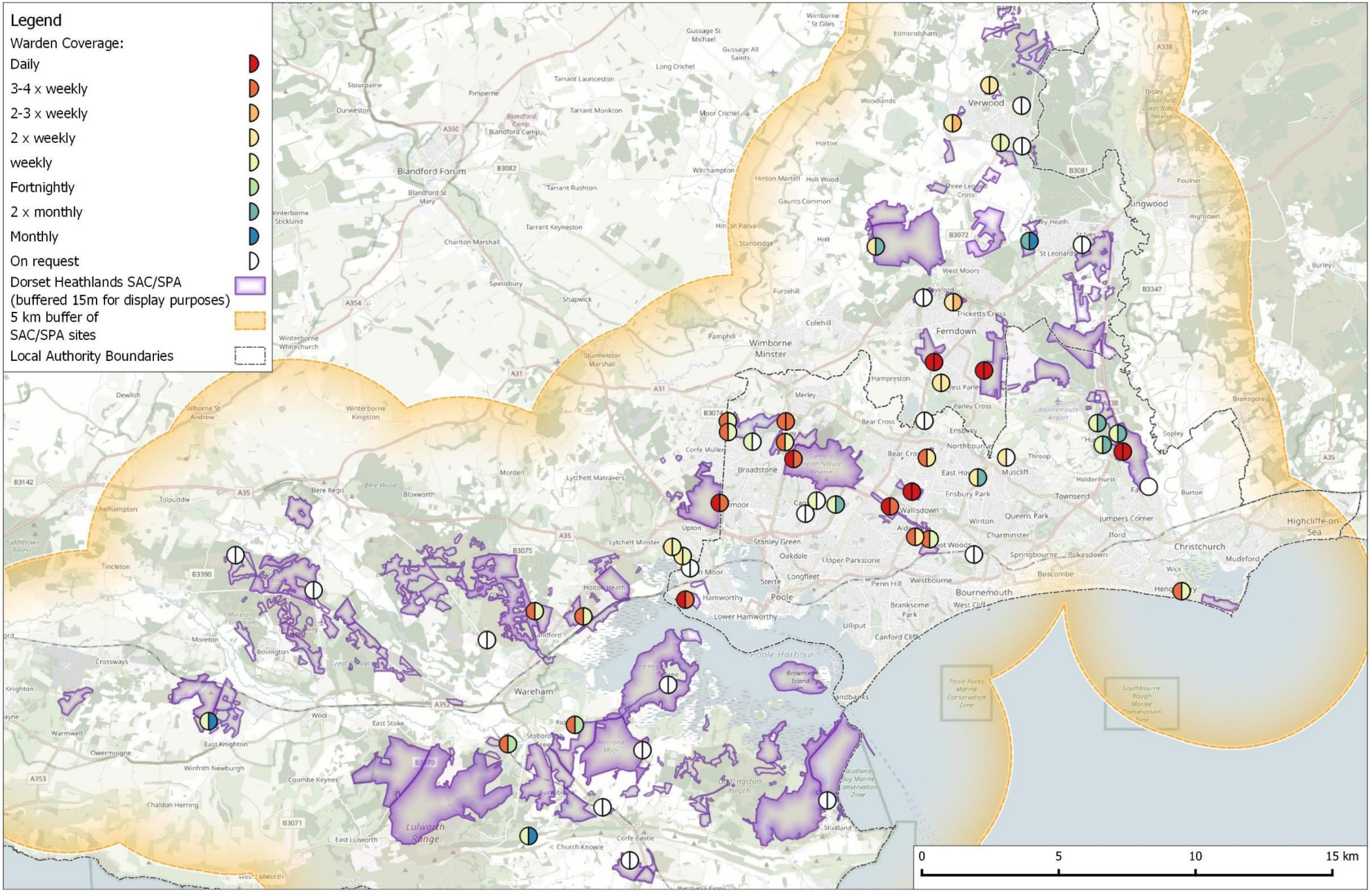
2.32 The map indicates that warden coverage has been targeted around the more urban heaths and around the conurbation.

2.33 More detailed and comprehensive data on warden coverage, recording time spent in different locations, incidents, people spoken to and the route covered is a key recommendation. Such data would allow analysis of how much wardening might be necessary, the relative need for wardening at different times of day and types of day (e.g. weekends vs weekdays) and better understand the level of wardening resource necessary to address future housing growth.

Spatial distribution of mitigation delivery (SAMM wardening)

Warden effort is targeted towards the more urban heaths. There are no detailed logs of warden time, coverage or success of wardening in terms of the number of people engaged with. Collecting such data is a key recommendation of the report.

Map 7 : Warden coverage and frequency at specific locations. Right half gives winter frequency and left half the summer frequency.



How effective has the Dorset Dogs mitigation project been?

Dorset Dogs overview

2.35 Dorset Dogs was originally set up via heathland mitigation funding and a grant from Natural England. The aims of the UHP Dorset Dogs project[12] are to:

- Raise awareness amongst dog owners and others of the important management issues and opportunities in relation to heathlands.
- Provide effective and consistent information on and off site for dog owners to support and promote responsible ownership and behaviour through targeted events, signs, leaflets, and online information.
- Provide support and advice to land managers on positive access management for people with dogs alongside effective engagement and education.
- Work across the project area ensuring that negative impacts are not transferred from one site to another; discouraging management that will displace problems elsewhere.
- Promote existing non-sensitive sites such as SANGs and areas where dogs are allowed off-lead.
- Support the development of new safe areas and SANGs for off-lead exercise, with involvement from the planning stage.
- Provide a broad and balanced coverage of dog owner-related issues, both positive and negative; avoiding a narrow focus to maintain the widest engagement.

2.36 The project is delivered by the Dorset Dogs Officer and part-time Dorset Dogs Assistant. The project encompasses work relating to engagement, education and liaison with dog owners, dog tourism and dog-related businesses. It brings together conservation, countryside and wildlife organisations and landowners including local authorities. Engagement methods have included:

- Information 'pit stop' events; either stand-alone or as part of bigger community events.
- An annual Dorset Dogs festival.
- Guided walkies.
- On-site visitor engagement.
- On-site information such as 'Doggy do code' signs and 'paw print' roundels.
- Website www.dorsetdogs.org.uk,
- Interactive forum www.facebook.com/dorsetdogs & Instagram.
- Membership group for people with dogs who live in or visit Dorset.
- Partnership working and canine access management advice provision to conservation and land-managing organisations and projects.
- Printed literature.
- Seminars/workshops for specific interest groups.

[12] These aims are taken from the UHP 2019/20 Heathland Mitigation Delivery Report

- Training and supporting volunteers.
- Running an ambassador group.

Membership

2.37 Members sign up to practice responsible behaviour and follow the Doggy Do Code, and membership has risen steadily, reaching 2,357 in 2020 (see Table 6).

2.38 Dorset Dog membership data include the home postcodes of members. Of the 2,397 postcodes on the current membership database, 2,185 could be georeferenced and plotted within GIS. The data for these 2,185 members show that 1,974 (90%) were residents of Dorset/BCP Council. Roughly 75% of all members lived within 5km of the Dorset Heathland SAC/SPA (1,616 members), 60% lived within 2.5 km (1,304 members) and 18% within 400m (394 members). This would suggest that the Dorset Dogs membership relates very well to the Dorset Heathlands and has been effective in targeting membership to the right locations. Data are summarised by heath in Table 7 and mapped in Map 8. Given there are 266,392 residential properties within 5km of the Dorset Heaths and national figures for dog ownership are around 1 in 3 households[13], the proportion of dog owners that are actually members of Dorset Dogs is small. While this would therefore suggest much scope for expansion, it is important to note that Dorset Dogs will target those that visit the countryside (rather than those who exercise their dogs on pavements, gardens or parks).

2.39 The membership form for those signing up to join Dorset Dogs asks where the person regularly walks their dog. Given this is sites visited at the time of joining, it would be expected that a high proportion of named sites would be Dorset Heaths sites. The data are patchy in that the responses logged inevitably include some general descriptions (such as 'local area', 'coast' etc.) and in some cases it is not always possible to attribute a particular site or location. Nonetheless, a review of the responses indicates around 37% of Dorset Dogs members are likely to have regularly use Dorset Heaths sites to walk their dog when they signed up. Around 16% of Dorset Dogs members had named a SANG or HIP as a site they regularly use to walk their dog. Given that many members joined some years before many SANGs were operational or effective, this would suggest that SANGs are playing a role in drawing a target audience of local dog walkers. Some 8% of all members listed multiple sites (where they regularly walked their dog when they joined) and named sites that included both Dorset Heaths sites and SANG sites. Given that the question did not specifically ask for multiple sites (and many named just one site) and the caveats around many members joining before some SANGs were

[13] https://www.pfma.org.uk/pet-population-2021 accessed 12th December 2021

established, this would suggest a good degree of overlap in recreational use between SANGs and the Dorset Heaths.

2.40 Growth in membership over time is shown in Figure 3. Overall membership has steadily increased over time with the period 2012 – 2014 seeing a particularly steep rise in the number of members. The number of new members appears to be tailing off slightly. Interestingly, the data would suggest that new members that walk their dog on the Dorset Heaths are accounting for a smaller proportion of the new membership in recent years. This potentially reflects the work of Dorset Dogs expanding more widely to include other parts of the county and coastal sites too. Interestingly the proportion of new members that visit SANGs has risen over time. In 2010, 8% of new members indicated they regularly walked their dog on a SANG or HIP site (i.e. named one of these sites), this had increased to 16% in 2020.

Figure 3: Cumulative numbers of members of Dorset Dogs over time. The blue line represents all members. The red line is those that named a Dorset Heath site as one they regularly walk their dog (at the time of membership) and the green line those that named a SANG or HIP site as one they regularly walk their dog (at the time of membership). Note that some indicated multiple sites including both heath and SANG/HIP.

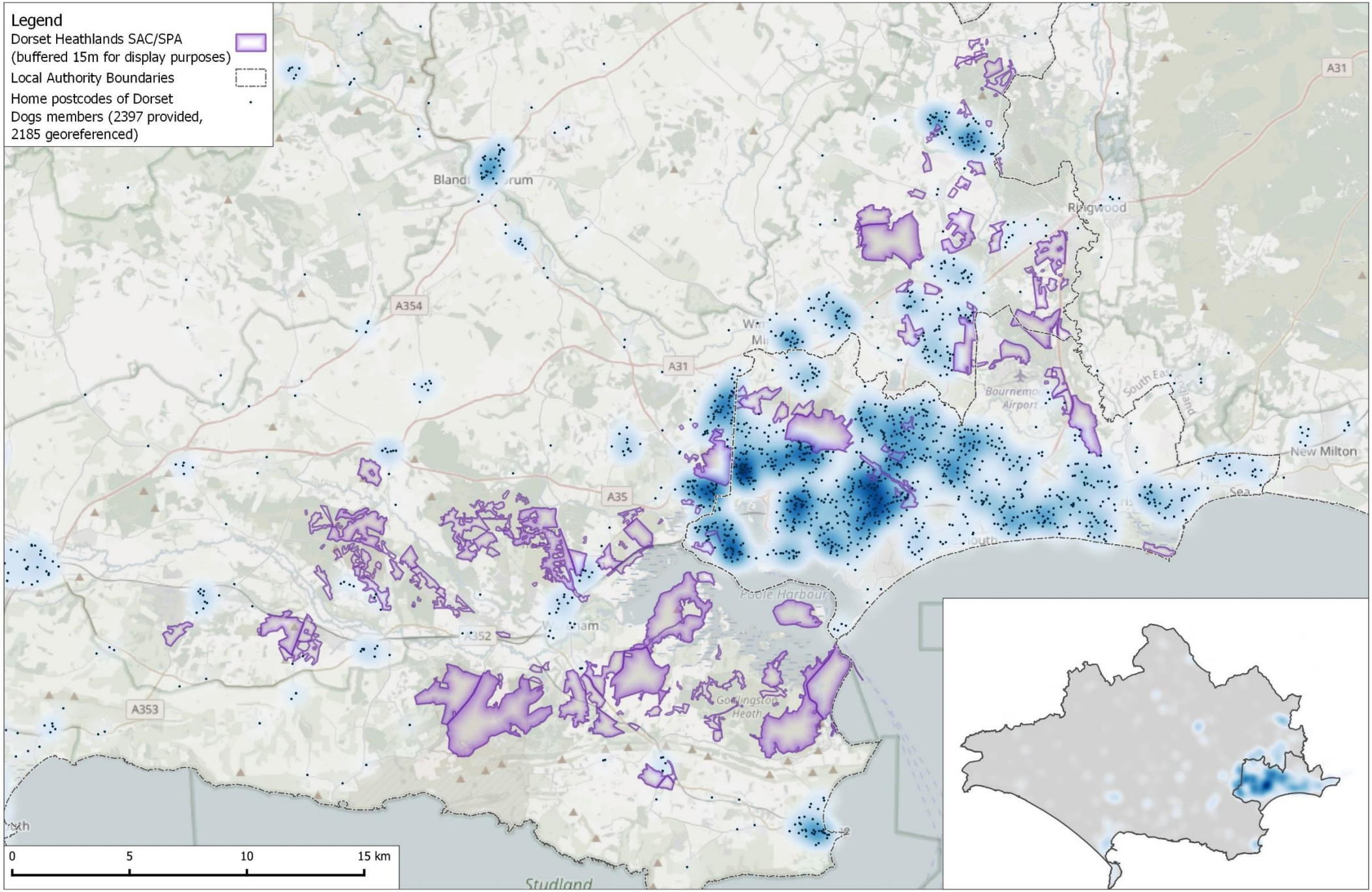
2.41 It should be noted too that the reach of Dorset Dogs extends beyond just the membership as for example events are attended by non-members and social media will reach a selection of non-members. The data for 2019/20 indicate that a single post on the on the Dorset Dogs Facebook page reached 47,500 people, highlighting the potential wider reach.

2.42 Interview data collected from the Dorset Heaths (Panter and Caals, 2020a) highlighted marked differences between sites relating to visitors' awareness of Dorset Dogs (Table 7). There was no significant correlation between the number of members around a heath (within 2.5km) and the responses recorded in Panter and Caals, suggesting that the variation in awareness was not related to the distribution of Dorset Dogs membership.

Table 7: Number of Dorset Dog members and houses within a 2.5km radius of different heathland sites. Rows are sorted by the percentage of households within a 2.5 km radius which are members of Dorset Dogs. Final column shows interview data from the subset of SSSIs where visitor surveying had taken place showing the awareness of Dorset Dogs amongst those dog walking.

Site	Size (ha)	No. of Dorset Dogs members	No. of houses	% of houses which are members	% interviewees dog walking aware of dorset dogs	Site	Size (ha)	No. of Dorset Dogs members	No. of houses	% of houses which are members	% interviewees dog walking aware of dorset dogs
Corfe Mullen Pastures	5	112	8,339	1.34	-	Holt and West Moors Heaths	687	132	18,031	0.73	40%
Poole Harbour: Lytchett Fields	13	143	10,799	1.32	-	Turners Puddle Heath	393	20	2,809	0.71	-
Holton and Sandford Heaths	202	64	5,282	1.21	-	Wareham Meadows	7	29	4,187	0.69	-
Upton Heath	220	270	22,381	1.21	69%	Morden Bog and Hyde Heath	655	34	4,913	0.69	50%
Black Hill Heath	71	11	958	1.15	25%	Worgret Heath	8	11	1,592	0.69	-
Ham Common	33	132	11,826	1.12	55%	Slop Bog and Uddens Heath	38	86	12,480	0.69	-
Corfe & Barrow Hills	102	196	17,954	1.09	-	Parley Common	163	122	17,719	0.69	47%
Arne	518	71	7,060	1.01	-	Brenscombe Heath	35	4	616	0.65	-
Corfe Common	91	10	1,007	0.99	-	Hartland Moor	302	10	1,544	0.65	58%
Winfrith Heath	289	24	2,426	0.99	45%	Thrasher's Heath	13	3	507	0.59	-
Canford Heath	409	421	42,590	0.99	78%	Bourne Valley	73	391	67,668	0.58	52%
Horton Common	18	58	5,986	0.97	-	Povington and Grange Heaths	1,123	19	3,557	0.53	-
Verwood Heaths	27	64	6,767	0.95	-	Oakers Bog	30	2	385	0.52	-
Hurn Common	82	38	4,241	0.9	-	Christchurch Harbour	36	56	10,907	0.51	-
Ebblake Bog	11	47	5,426	0.87	-	Town Common	257	85	16,767	0.51	51%
Rempstone Heaths	166	8	933	0.86	-	Lions Hill	43	35	6,995	0.5	19%
Stokeford Heaths	175	16	1,916	0.84	-	Poole Harbour: Brownsea	162	34	7,114	0.48	-
Blue Pool and Norden Heaths	93	10	1,223	0.82	-	St Leonards and St Ives Heaths	412	39	8,470	0.46	35%
Turbary and Kinson Commons	33	312	38,858	0.8	60%	Studland & Godlingston Heaths	756	11	2,460	0.45	33%
Cranborne Common	134	53	6,664	0.8	15%	Stoborough & Creech Heaths	334	11	2,609	0.42	56%
Ferndown Common	64	96	12,612	0.76	79%	The Moors	20	2	660	0.3	-

Map 8 : Distribution of Dorset Dog member postcodes shown as heatmap around the SAC/SPA and for the whole of Dorset (inset map).



Dorset Dogs

Dorset Dogs works to bring dog walkers together and to promote responsible dog walking. Established in 2009, membership has steadily increased to nearly 2,360 current members. Roughly 75% of members live within 5km of the Dorset Heaths. At the point of joining, around 37% of members indicated that they regularly walked their dog on a site that was part of the Dorset Heaths. Membership has risen steadily over time with a slight indication that the rate of new members is starting to tail off and that the number of members that regularly walk on the Dorset Heaths is also starting to tail off.

How effective have other mitigation projects been? (e.g. school engagement and community projects such as Firewise)?

2.43 A range of other mitigation measures, besides the SANGs, Wardening and Dorset Dogs have taken place. In this section we consider these, summarising measures relating to:

- Education work;
- Firewise;
- Events; and
- Other.

Education work

2.44 Education activities have been developed to deliver the key messages and fit with the National Curriculum. Examples of education work delivered by UHP include (and listed in order of priority):

- Arson Courtroom Drama sessions delivered to Key Stage 3 year 8 students (aged 12 -13 years) to reinforce the importance of heathlands due to their wildlife and biodiversity and highlight the consequences of heathland fires to the wildlife and the community. The sessions are interactive sessions with students acting out parts within a courtroom setting.
- Heathland related activities to Key Stage 1 and 2, year 1 - 6 students (aged 5 -11 years) including visiting heathland sites and learning about the wildlife and habitat, these have the aim of increasing understanding of the habitat.
- Field visits for GCSE students (aged 14 – 16 years). Students identify a variety of heathland species and employ relevant sampling techniques, using scientific equipment, to collect data which can be used for statistical analysis. The investigation involves a comparative study of 2 burn sites and the subsequent

regeneration of vegetation. This effectively delivers the key messages of the negative impacts of fire along with other pressures which affect the heathland habitats.

2.45 Targeting Key Stage 3 has been prioritised to ensure local young people understand the consequences of fires on heathlands and to promote reasons why heathlands are considered important. During 2019 this was developed further by introducing the GCSE Science programme which builds upon the complexity of understanding of the habitat in line with cognitive ability. The next priority is given to Key Stage 2 students to raise awareness of the heathland habitat. This is considered an important educational aim as it provides the potential for children to develop an understanding and awareness of the heathlands at a younger age to enable them to identify the importance of heathland sites when reaching year 8 and taking part in the Courtroom Drama.

2.46 This core education work has been supplemented with other education work, for example in 2019/20 the UHP education staff continued to support BCP Council Nature Tots by delivering weekly activities at the successful Nature Tots club; work was carried out with 3 youth organisations and activities have been run in libraries such as heathland themed activities and talks, reaching children and adults.

2.47 Schools are mapped in Map 9, which shows those schools where activities took place in 2019/20. The same core schools are targeted each year and this includes a range of schools including primary and secondary. The range of schools included in the programme and the distribution reflects those in proximity to heaths and some of the sites with the most recent fires (see Map 22). 20 of the 33 schools mapped were within 1km of the heath and those which were outside of this area were often key, large schools (e.g. Hamworthy Park Junior, The Purbeck School, Glenmoor and Winton Academies).

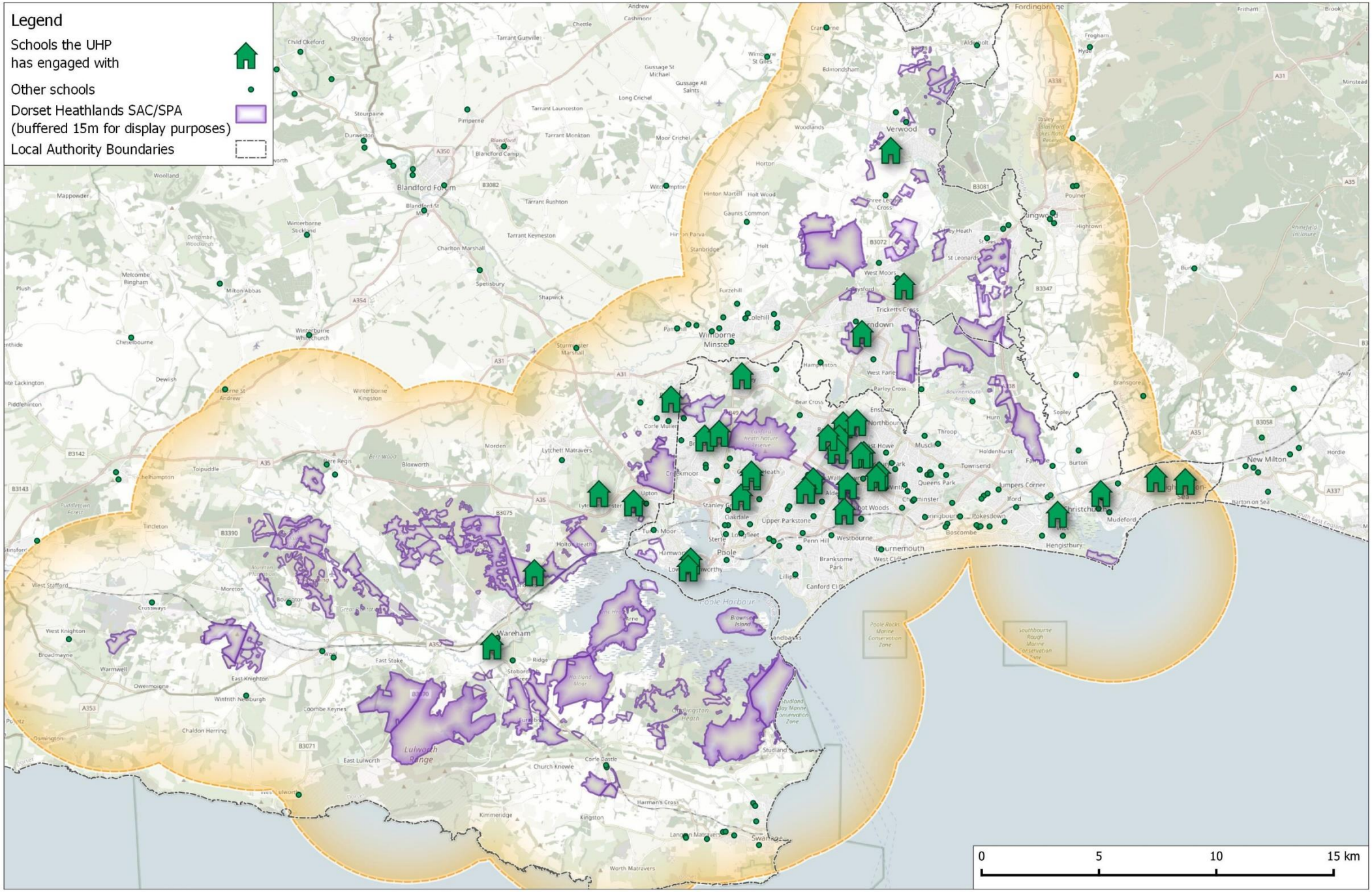
2.48 Reviewing the data would suggest there are some schools that could be included that are close to heaths and therefore scope for the education work to expand further. We have not used individual school buffers[14] , but extracted from GIS those that are within 1km of the Dorset Heaths. There are around 61 schools within 1km of a heath, of which 32 schools were not engaged with in recent years. These are mostly primary schools and are as follows:

- Bovington Primary
- Bere Regis Primary
- Stobrough Primary
- Corfe Castle Primary

[14] School catchments are shown on the Dorset Explorer website, however they overlap for different schools / types of school and make visual interpretation of the data difficult.

- Yarrells Prep School
- Turlin Moor/ Bayside Academy
- Henbury First (Corfe Mullen)
- Rushcombe First (Corfe Mullen)
- Springdale First (Broadstone)
- Corfe Hills School (Broadstone)
- Poole Grammar (Poole)
- Montacute School (Poole)
- Ad Astra Infant School (Poole)
- Bearwood Primary (Bournemouth)
- Winchelsea School (Poole)
- St Joseph's Catholic Primary (Poole)
- Langside School (Poole)
- Talbot Heath School (Bournemouth)
- Twynham Primary School (Christchurch)
- Portfield School(Christchurch)
- Parkfield School (West Parley)
- Parley First (West Parley)
- Ferndown Upper
- Ferndown First
- Oakhurst Community (West Moors)
- St. Mary's C.E. First (West Moors)
- St Ives First (Ringwood)
- Sheiling School (Ringwood)
- Ringwood Waldorf
- Three Legged Cross First
- Trinty CofE VA First (Verwood)
- Hillside Community First (Verwood)

Map 9 : Distribution of schools engaged with in the context of the Dorset Heathlands.



Firewise

2.49 The Firewise Communities Project started in 2018 and aims to create a sustainable network of community focussed groups concentrating on building resilience against wildfire damage to residential properties in southeast Dorset. These are centred around communities on the urban interface with heathland sites. The Firewise Project Assistant works 2 days per week with funding agreed until March 2022.

Events

2.50 Two large events were attended during 19/20, the Heathland Hullabaloo and the Dorset Dogs Festival and a smaller event at Bytheway Field SANG, with different activities carried out at each. Around 3,290 people were engaged with at events in 2019/20.

Other

2.51 The Heathland Life newsletter details the work of the UHP team. It is sent out to Councillors and Partners through email as a PDF every 6 months.

Other mitigation projects

Other mitigation work includes school engagement, the Firewise Communities Project and events. We have mapped the schools where education sessions have been run by UHP staff in recent years, and these are in close proximity to the Heaths. We have identified a range of additional schools, mainly primary schools, that are within 1km and would indicate that there could be room for expansion of the education work.

What is the level of wardening since 2007 and what is the optimum deployment?

2.52 Data are available for the years 2007-2013, giving the time wardens have been deployed and patrolling on the heaths. There is no record of where the wardens actually spent their time or how many people they spoke to.

2.53 The data on time show the amount of time spent per year ranged from 1,258 to 4,915 hours, with a mean of 3,089 hours. We might therefore consider around 3,089 hours of time allocated to wardening per year typical. If we assume that some of that time (perhaps around 10%) is spent on travel, then this means roughly 2,780.1 hours are available actually on the heaths. This equates to roughly 7.6 hours of warden time per day (based on 365 days per year, assuming an even distribution of warden effort across the year).

2.54 In 2007, we estimated that there were around 531 access points onto the heaths (and adjacent land) and a total of 5,215 car-park spaces across the Dorset Heaths as a whole (Liley et al., 2007). Wardens patrol sites, walking around the heaths and talking to visitors/dealing with any problems. If warden effort were spread equally across all access points, then this means around 5.2 hours of warden time are available per year at each access point. Of course, warden effort at many access points will be much higher than that as effort is focussed on particular heaths and the 531 access points include many rural sites (such as Rempstone) or sites such as Arne where there is an existing UHP partner organisation warden presence.

2.55 It is perhaps better to consider warden effort in relation to visitor numbers. In 2007 we estimated around 15,000 people visiting per day, approximately split such that there were 2.2 people arriving by car for every person that arrives on foot[15]. Vehicle counts indicate around 253.2 cars on average at any one time on the core heath sites, based on the counts in 2019-20 (see Figure 16 and later sections of the report for further detail). These are the key locations where wardening effort funded through SAMM is targeted. The typical visit duration is around an hour (Panter and Caals, 2020a), so based on a 12 hour day we can scale 253.2 figure to give 3,038.4 groups per day. If we use the ratio from the 2007 modelling, then a further 1,381.1 people might be expected to arrive on foot per day, giving around 4,419.4 groups visiting per day.

2.56 Discussion with UHP staff suggests that wardens will engage with around 4 groups of visitors per hour. This kind of rate allows discussion and meaningful dialogue

[15] This would mean the 15,000 visits is broken down to 4688 people per day arriving on foot and 10,312 arrived by car

with visitors. With roughly 7.6 hours of warden time available[16], it would seem likely that wardens may be able to engage with around 30.4 visitor groups per day (assuming wardens were evenly distributed and so were visitors). This means wardens may engage with around 0.7% of the people on the heaths in any one day.

2.57 This is clearly a relatively low percentage, but it is important to also note that a proportion of visitors will be regular and frequent visitors and therefore over time the proportion of visitors engaged with will rise.

2.58 We have shown the effect of prolonged wardening in Figure 4. From the 2019 visitor survey data we know the frequency with which interviewees visited the site where interviewed (see Table 8). For example, 20.1% of interviewees stated they visited roughly daily. If warden time is evenly distributed, visitors are also evenly distributed and the probability of encountering a given type of visitor is the same regardless of how frequently they visit, then we might expect 20.1% of the warden engagement to be with daily visitors. With an estimate of around 30.4 groups engaged with per day, then 6.11 groups (out of the 30.4) might therefore be expected to be daily visitors. If we assume on a subsequent day the warden would not engage with anyone they have previously engaged with, then a further 6.11 daily visitors would be engaged with.

2.59 Using this approach, we roughly estimate that the typical warden coverage of 3,089 hours per year (evenly spread across the year) would mean that after around 76 days all those who visit more than daily would be engaged with. Around 144 days into the year, all daily visitors would be engaged with and by 224 days into the year all those who visit most days would be engaged with. Near the end of a year (342 days), all those who visit 1-3 times a week would be engaged with. However, for those who visit infrequently, a low proportion are likely to be engaged with, for example the level of wardening would mean after a year only around 29% of those who visit 2-3 times per month would be engaged with. For those visiting once a month, the wardening effort is sufficient to engage with around 11%.

2.60 Our approach is relatively simplistic but would suggest warden deployment has scope to expand further and the current level of deployment is likely to reach most very regular visitors but relatively few of those who visit less frequently. Our approach assumes wardens only speak to visitors once, or at least they engage with 4 sets of new visitors each hour (that have not been spoken to before).

[16] See para 4.26, this is the figure for hours worked per day but and is calculated from actual warden provision and is the amount of time across the warden team spent wardening per day

Table 8: Visit frequencies from 2019 visitor survey and engagement.

Visit frequency (from 2019 visitor survey)	Approx visits per year	Number of interviewees	% of interviewees	Number engaged with per day*	Total groups visiting per day**	Number visiting per year
More than once a day	700	97	10.3	3.13	455.2	237.4
Daily	350	190	20.1	6.11	888.3	926.4
Most days	200	146	15.4	4.68	680.6	1242.1
1 to 3 times a week	110	246	26	7.90	1149	3812.6
2 to 3 times per month	27.5	63	6.7	2.04	296.1	3930.1
Once a month	10.5	60	6.3	1.92	278.4	9677.7
Less than once a month	3	73	7.7	2.34	340.3	41,403.2
First visit	1	63	6.7	2.04	296.1	108,076.5
Don't know	0	2	0.2	0.06	8.8	
Other	0	5	0.5	0.20	22.1	
Total		**945**	**100**	**30.4**	**4414.9**	**169,305.8**

* we estimate a warden can engage with around 4 groups per hour, and therefore based on typical warden coverage we estimate 30.4 groups are engaged with per day. This column breaks the 30.4 total down using the % of interviewees, assuming the interviewees to be a random sample.

** we estimate 4414.9 groups visiting per day, from the visitor data. This column breaks the 4414.9 total down using the % of interviewees, assuming the interviewees to be a random sample.

*** the number visiting per year is calculated as the total groups visiting per day multiplied by 365/the approx. visits per year.

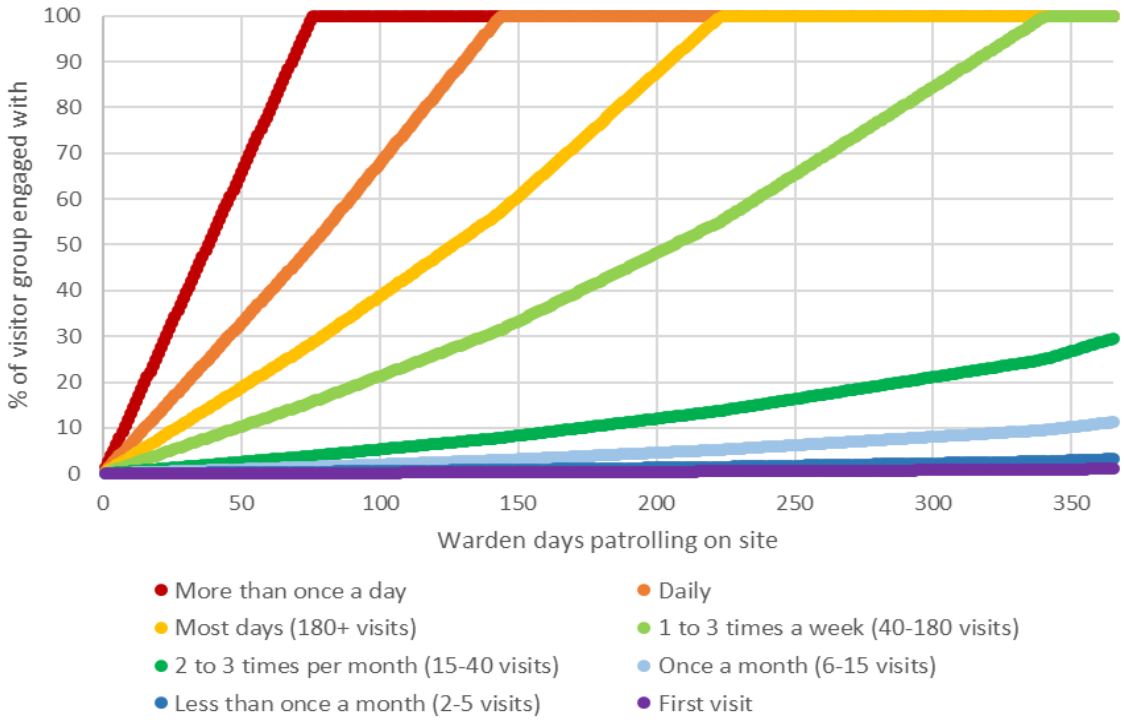


Figure 4: Percentage of different types of visitors engaged with across the Dorset Heaths over a year, based on current levels of warden coverage

Warden deployment over time and optimum wardening deployment

From the data that are available it would seem around 3,089 hours of warden time per year is spent on the heaths. There are no detailed records of the areas patrolled or the number of people spoken to, however we estimate around 4 people per hour might be intercepted and engaged with. This level of coverage could mean around 0.7% of the people visiting the heaths on any one day are engaged with.

We roughly estimate that warden coverage of 3,089 hours per year (evenly spread across the year) would mean that after around 76 days all those who visit more than daily would be engaged with (i.e. spoken to once), assuming warden time is evenly distributed, visitors were evenly distributed and the probability of encountering a given type of visitor is the same regardless of how frequently they visit. Around 144 days into the year, all daily visitors would be engaged with and by 224 days into the year all those who visit most days would be engaged with. These estimates are heavily caveated and very crude. They would imply that warden deployment has scope to expand further and the current level of deployment is likely to reach most very regular visitors but relatively few of those who visit less frequently.

What is the overall level of HIPs mitigation delivery?

2.61 Heathland Infrastructure Projects are a collective term for a wide range of projects that act as mitigation. These have included a large amount of new greenspace provision, through new SANG sites, supporting existing locations at HIP sites and other smaller scale support and running costs. The wide range of projects include:

- Bespoke development linked SANG (e.g. Frenches Farm, Canford Park);
- Strategic SANG (e.g. BytheWay, Upton Country Park);
- Private development linked SANG (e.g. Burnbake, Stapehill Abbey);
- Large HIP whole site access improvements, often spread over several separate interventions (e.g. Poor Common, Potterne Park).
- HIP small scale specific Longmeadow Woods
- HIP small scale specific activity access (e.g. new Stony Lane BMX area, repairs to Redcotts Wheel Park)
- Access and education interventions (e.g. Upton Heath Urban Wildlife Centre, Dorset Dogs support)
- SPA/SAC heathland interventions (e.g. Access improvements for emergency fire vehicles)
- "Running cost" projects (e.g. SANG maintenance, UHP monitoring)

2.62 A list of SANG sites and site boundaries were collated with UHP and the Councils, and a list of HIPs were provided. SANG and HIP improvement sites were mapped, some as site boundaries and others as point locations, without a set boundary. A total of 39 HIP projects were mapped (as of April 2022), 6 of which had site boundaries and 18 existing SANG sites were mapped. A further 5 HIP and 25 SANG sites which are either confirmed or potential future sites were also mapped, however unconfirmed, potential future sites are not presented in the maps. The distribution of existing SANGs and HIPs are shown in Map 10.

Table 9: Number and area (where appliable) of HIP and SANG projects.

HIP and SANG projects	Number of sites/projects	Total area (Ha)
Existing HIPs (where a site boundary has been given)	6	84
Existing HIPs (where no site boundary was given)	**33**	**n/a**
Existing SANG	18	279
Total	57	363

2.63 The total area of existing SANGs is 278.6ha (across 18 sites[17]) and there are a further 115ha of confirmed SANG to be delivered. Given that the area of the two Dorset Heaths SACs and SPA is 8359ha, the area of existing SANGs represents an

[17] These 18 sites include the different phases of Upton Country Park

increase in area of 3.3%, and with the inclusion of the confirmed SANG to be delivered an increase of 4.7%. In other words, the SANGs provide a further 4.7% of accessible greenspace compared to the area of the European site. This is not quite in line with the increase in housing (5.7%) within 5km, with the discrepancy being reflected in mitigation delivered by other HIP projects etc.

2.64 The SANG sites range from 52ha (Canford Park) to 4ha (Cuthbury allotments and South of Leigh Road (west), the latter being part of a larger site). Overall, the mean size of the SANG sites was 16ha and for the mapped HIP sites is 14ha (although many are much smaller and were not mapped) – see Table 10.

2.65 SANG sites are either linked to a specific development or are strategic sites, with contributions from multiple different developments. Four strategic SANG exist, all sites over 10 ha: BytheWay, Stanpit Riversmeet SANG and Golf Course, Upton Country Park (Phase 1 and 2 combined) and Woolslope (with a mean area of 18ha).

2.66 The number of new residential properties that funded different SANGs were provided for some sites. These ranged from 22 (Burnbake, associated campsite, private SANG) to 1,124 (Canford Park). The mean value was 225 houses per SANG.

2.67 Costs for some HIP projects were provided, but not for all sites and therefore costs are not considered in any detail. The highest costs were associated with the annual UHP wardening, education and monitoring programmes and the strategic co-ordination of access management. This was followed by some large scale improvements (e.g. improvements to Strouden Park, Hengistbury Head, Ferndown KGV Heathland Support) and site land purchases for SANG and HIP sites (e.g. Woolslope, Upton Farm for Upton Country Park, Chewton Gateway).

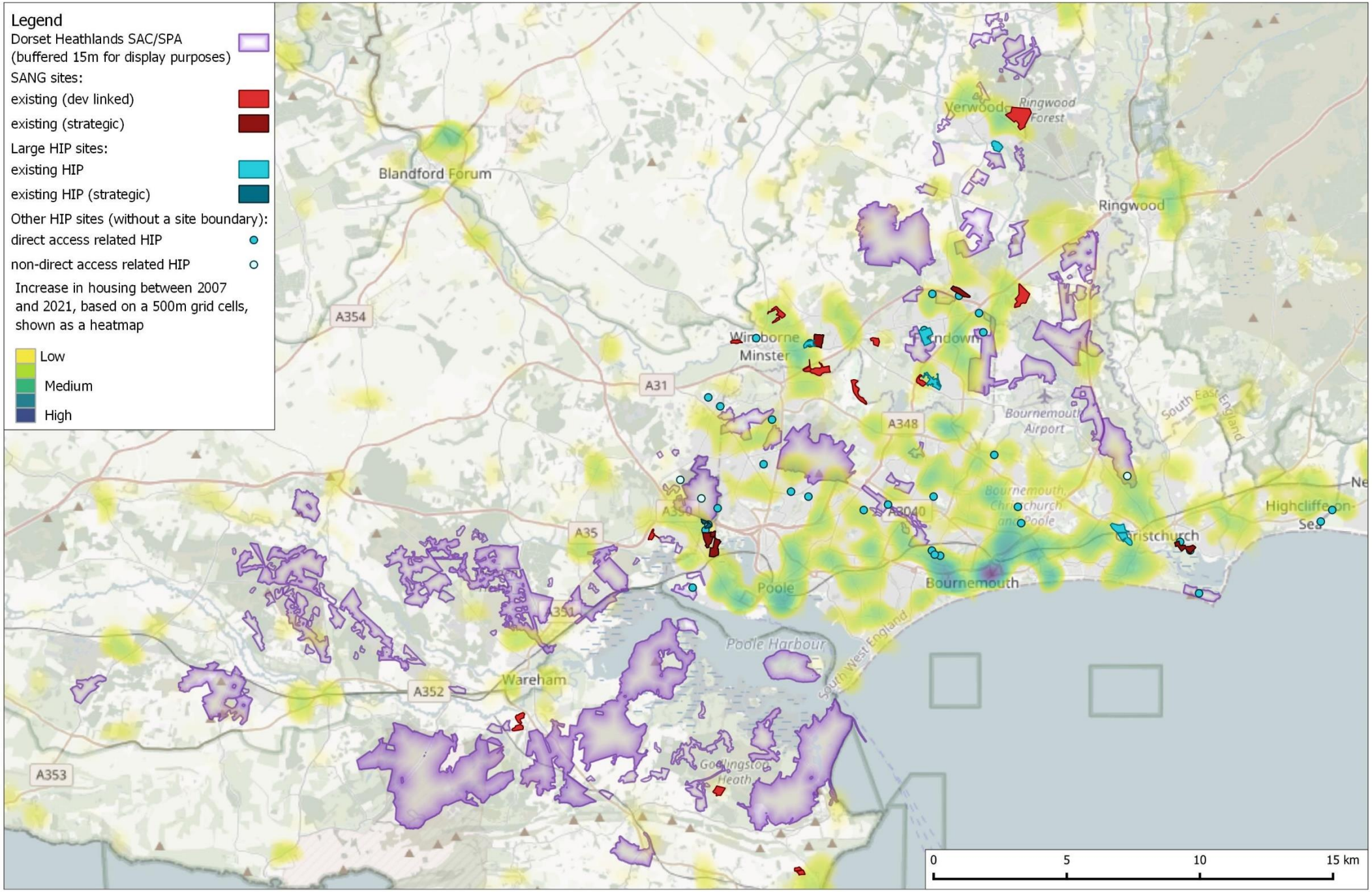
Table 10: List of the open mitigation sites (i.e existing sites, shown in Map 10); 6 mapped HIP sites and 17 SANG sites (17 SANGs listed as Upton Country Park phase 1 and 2 combined). The size in ha is approximate.

	HIP / SANG site name	Area of site (Ha)
HIP		**84**
Ferndown	King George's Charity Field	20
Ferndown	Poor Common	15
Iford	Iford Lane Playing Fields	26
Upton	Upton Wood	5
Verwood	Potterne Park	11
Wimborne	Leigh Common	7
SANG		**279**
Christchurch	Stanpit Riversmeet SANG	13
Corfe Castle	Burnbake	10
Ferndown	Holmwood House	7
Ferndown	Stapehill Abbey	7
Merley	Canford Park	14
St Leonards	St Leonards Hospital	25
Stoborough	Bog Lane	14
Swanage	Swanage Northbrook	6
Upton	Upton Country Park	34
Upton	Frenches Farm	5
Verwood	Verwood, Ringwood Road	45
West Moors	Woolslope	12
Wimborne	South of Leigh Road (east)	17
Wimborne	BytheWay	15
Wimborne	South East and North East Wimborne	10
Wimborne	Cuthbury allotments	4
Wimborne	South of Leigh Road (west)	4

2.68 HIP spending includes money given to established SANG sites (e.g. access improvements, signage, management and monitoring). These projects were not included in our maps. The exception to this is the Stanpit Riversmeet SANG SANG which was initially a HIP site, but latterly grew in size and developed into a SANG site.

2.69 Map 10 shows SANG sites are often in more rural areas, where large areas of land are available for a new development and new greenspace – exceptions to this are the more strategic SANGs which often utilise existing greenspace. Other HIP sites, particularly smaller projects (i.e. those without a boundary in Map 10) are in the more urban areas.

Map 10: Distribution of exisiting SANG and selected HIP sites, shown over a heatmap of the change in housing between 2007 and 2021.



What are the catchments of HIPs/SANGs and how do these compare to heaths?

2.70 Map 11 shows the home postcodes of visitors who were interviewed at selected SANGs between 2012 and 2019. Summary statistics of the straight-line distances between the interviewee's home postcode and the location where they were interviewed are shown in Table 11.

2.71 The distance between home postcode and survey location varied between sites. Some sites have a very local catchment, for example, Woolslope SANG had particularly local visitors, with half of interviewees living within 400m of the site, in both surveys. Frenches Farm SANG and Iford Lane Playing Fields HIP also had mostly local visitors, with half of interviewees living within 0.8km of the survey location for both, and 75% of interviewees living within 1.5km. In contrast, Bog Lane SANG had visitors from a much wider area, with half of interviewees living over 5km away. This is possibly due to its rural location, although it should be noted that there was a small sample size of just 10 interviewees at this site.

2.72 There was no particular difference between SANG and other HIP sites with large catchments for both SANG (i.e. Bog Lane) and HIP (i.e. Stanpit). Visitors would often not notice differences between these sites in terms of SANG/HIP and visitor catchment are obviously more driven by the wide range of factors such as desirable, accessibility, and density of the local population (i.e. rural vs urban).

2.73 The 75th percentile is a useful value to express the radius in which most interviewees originate and for the SANGs the average 75th percentile (based on the most recent survey data for each site) is 3.9km. Table 11 also gives a comparable figure for the Dorset Heaths, using the data and for the 23 survey locations used in the 2019 Dorset Heaths visitor survey.

Table 11: Summary of straight-line distance (km) from home postcode to survey location for SANG visitor surveys conducted 2012-2019. N indicates the number of interviewees who provided a full, valid postcode; the total number of interviewees may be higher. The three largest and smallest 75th percentiles are highlighted in red and blue respectively.

Site name		Year	N	Mean ± SE	Min – Max	Median	75th percentile
DORSET HEATHS		**2019**	**907**	**14.1 ± 1.50**	**0.01 – 484.3**	**1.5**	**4.4**
Bog Lane SANG		2017	10	5.6 ± 1.51	0.24 - 11.8	5.1	**11.6**
Bytheway Field SANG		2012-13	23	12.2 ± 7.95	0.42 - 136.9	0.6	**1.1**
		2017-18	64	2.3 ± 0.41	0.29 - 15.8	1.2	1.9
Canford Park SANG		2018	22	2.8 ± 0.43	0.52 - 7.8	2.2	3.8
Frenches Farm SANG		2018	42	1.3 ± 0.24	0.22 - 8.7	0.8	1.5
Iford Lane Playing Fields HIP		2019	69	1.1 ± 0.13	0.09 - 6.7	0.8	1.3
Stanpit SANG/ HIP	Riversmeet & Stanpit SANG	2019	70	2.0 ± 0.29	0.08 – 11.6	1.0	2.8
	Stanpit Recreation Ground HIP	2012	9	36.4 ± 23.45	0.45 – 162.5	1.1	**79.9**
		2015	49	5.0 ± 3.46	0.26 – 170.4	0.9	2.1
South of Leigh Road SANG		2018	61	4.4 ± 0.48	1.15 - 25.7	3.4	**6.1**
Upton Country Park	Phase 1	2015	129	6.1 ± 1.82	0.24 – 173.3	3.4	**6.1**
	Phase 1	2018	119	8.1 ± 2.88	0.24 - 301.5	2.9	4.6
	Phase 2	2018	98	9.1 ± 3.35	0.42 - 270.9	2.0	4.8
Woolslope SANG		2012-13	10	0.4 ± 0.08	0.27 – 1.0	0.3	**0.6**
		2013-14	14	0.4 ± 0.08	0.16 – 1.3	0.4	**0.4**

2.74 Figure 5 compares individual SANG/HIP sites and the Dorset Heaths using the median distances from home postcode to survey location for each of SANG/HIP surveys in Table 11, alongside the median distance values from each of the 23 survey points in the Dorset Heaths. There is a concentration of both SANGs/HIPs and heath sites which have a low median distance, as well as some locations with larger median distances. The highest median distances, however, are all heathland sites, namely Studland, Hartland Tramway, Ham Common, Morden, Avon Heath Country Park, Black Hill and Winfrith. It is interesting to note that the heaths with the highest median values are all Dorset sites and predominantly rural. SANG sites in general seem to have a draw similar to many heaths but do not appear to attract visitors from as far as some of the larger, more well known, rural and scenic heathland sites.

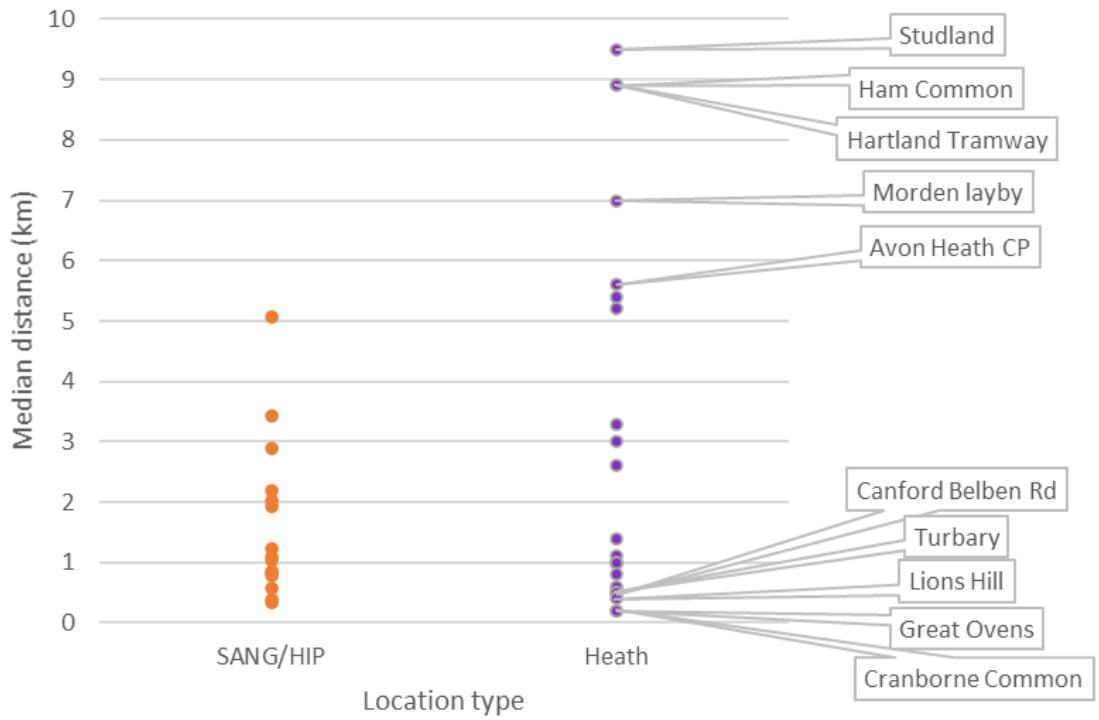


Figure 5: Median distances from home postcode to survey location, for various SANGs/HIPs and from the individual survey points in Dorset Heaths 2019 visitor survey.

2.75 Map 12 shows the interviewee postcodes with a line drawn around the closest 75% of interviewees. This gives an indication of the 'catchment' within which most visitors live.

2.76 The catchment area of a particular site is likely to be influenced by a number of factors: the size of the site, the location of the site in relation to housing, and the facilities available, in particular, the amount of parking (if any). The attractiveness of the site and how it is promoted are also likely to influence use. As such variation between SANGs is to be expected. The pooled postcode data from all the SANG sites cover a wide area and encompass the areas where housing growth has occurred.

2.77 Map 13 shows the distribution of interviewees postcode from the 2019 Dorset Heaths visitor survey (Panter and Caals, 2020a). The map also shows the distribution of postcodes from the SANG interviewees (as also presented in Map 11), the comparison with the two sets of postcodes and the HIP/SANG convex hulls in Map 12 is possible. The map clearly shows that the SANGs are drawing visitors from the same area that visitors to the heaths originate. The same data are shown in Map 14 which uses a 2km hexagonal grid. For each grid cell proportion of interviewees who were interviewed at SANGs vs heaths is shown. The pie charts suggest areas of Bournemouth and Poole have mixed overlap with SANG and heath

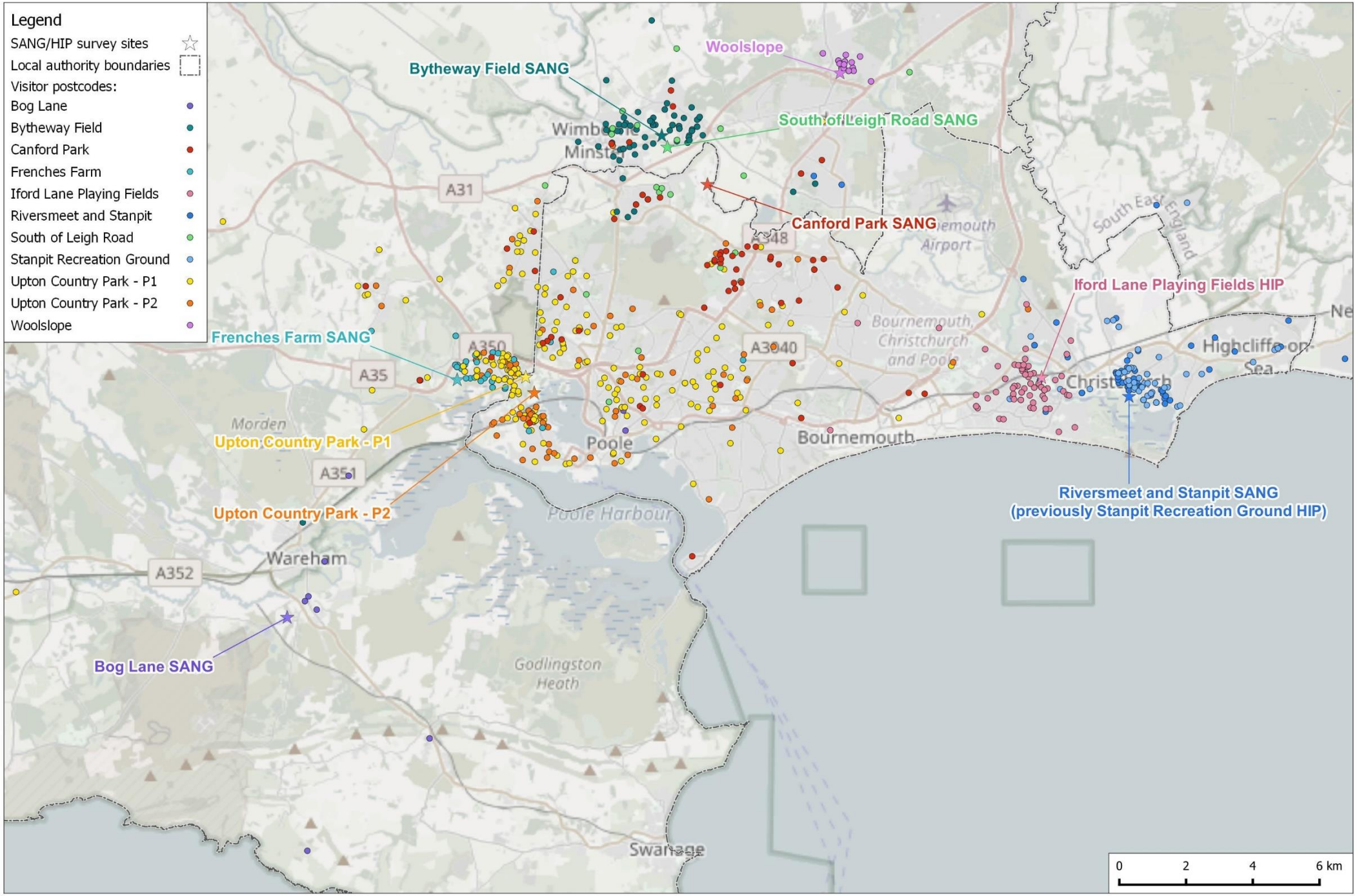
visitors. It should be noted that the map is heavily influenced by the distribution of survey points, and interpretation needs to recognise that areas such as Christchurch appear to have few heathland interviewees relative to SANG users but this may be due to limited heath survey points in those locations. If heathland sites with large draws such as Hengistbury Head had been included, then the local distribution could of course be different.

Catchments of HIPs/SANGs

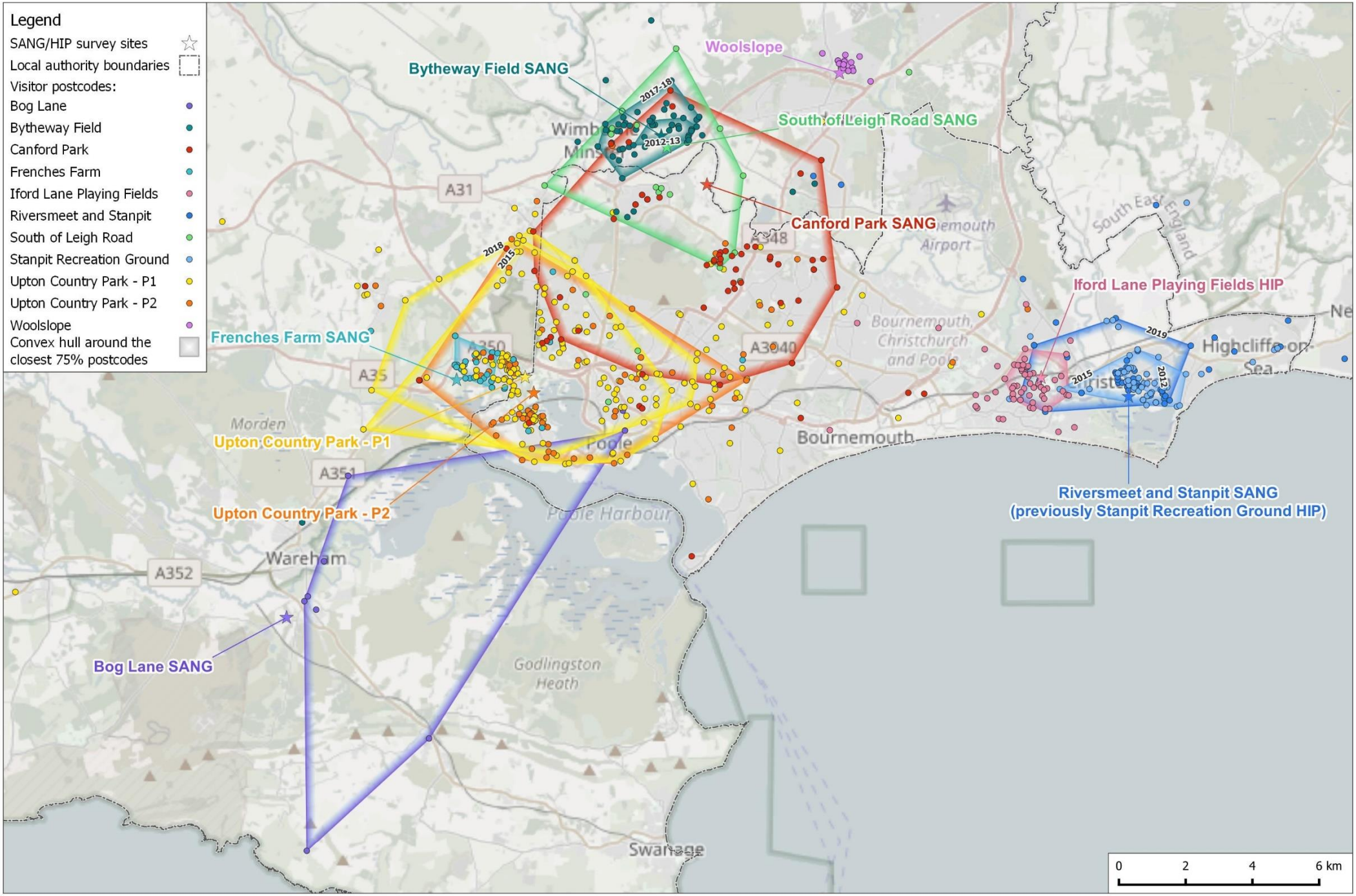
Dorset SANGs/HIPs in general seem to have a draw similar to many heaths or slightly less and the average distance within which 75% of visitors originated for all SANGs sites was 3.9km. Postcode data from the heaths and the HIPs/SANG show a clear overlap, showing that the HIPs/SANGs are drawing visitors from areas we know people who visit the heaths live.

A wide range of factors such as the sites desirability and accessibility will alter these catchments.

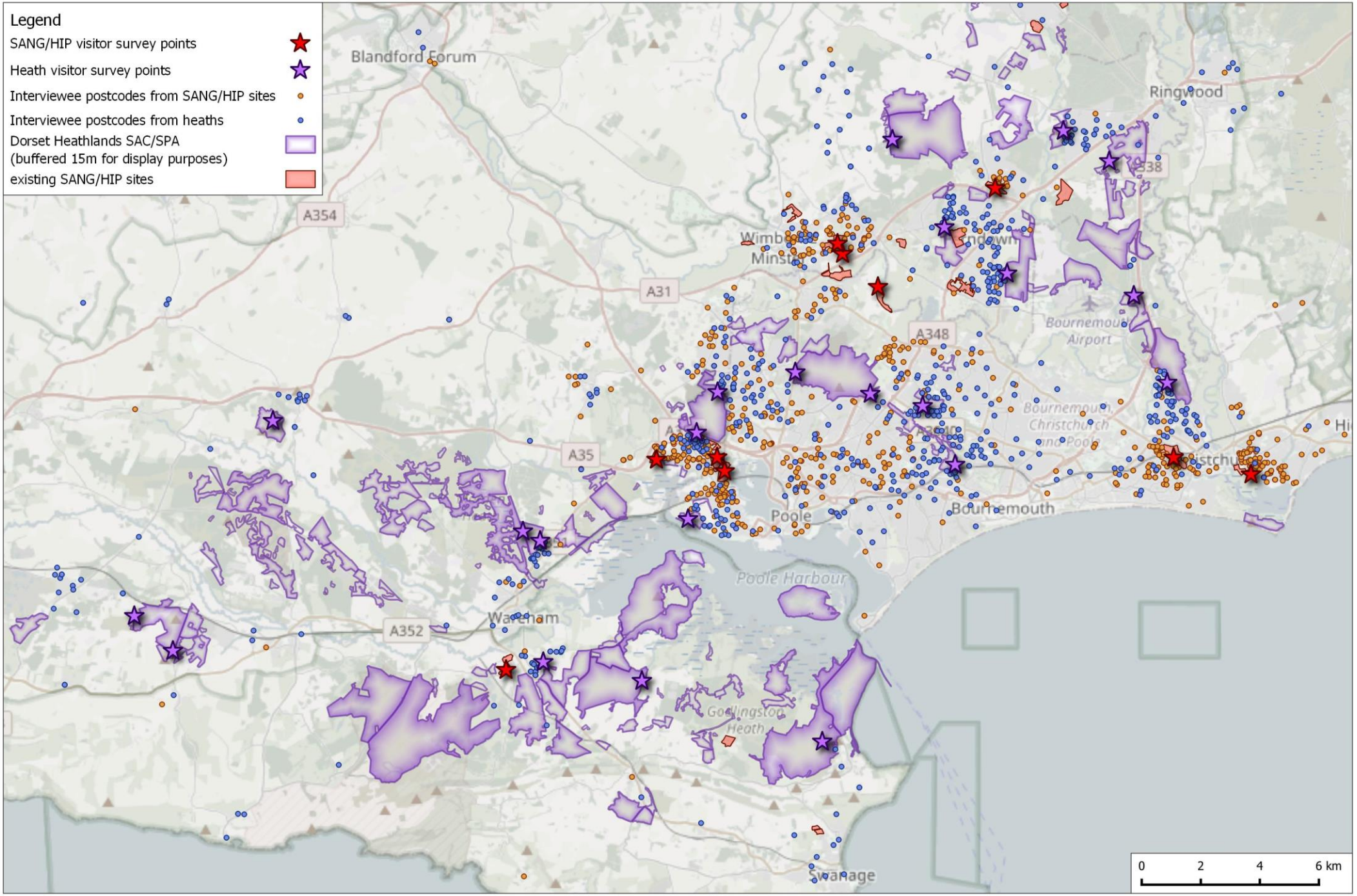
Map 11: SANG/HIP visitor postcodes. Some postcodes are off the map. Some sites will include postcodes from more than one survey.



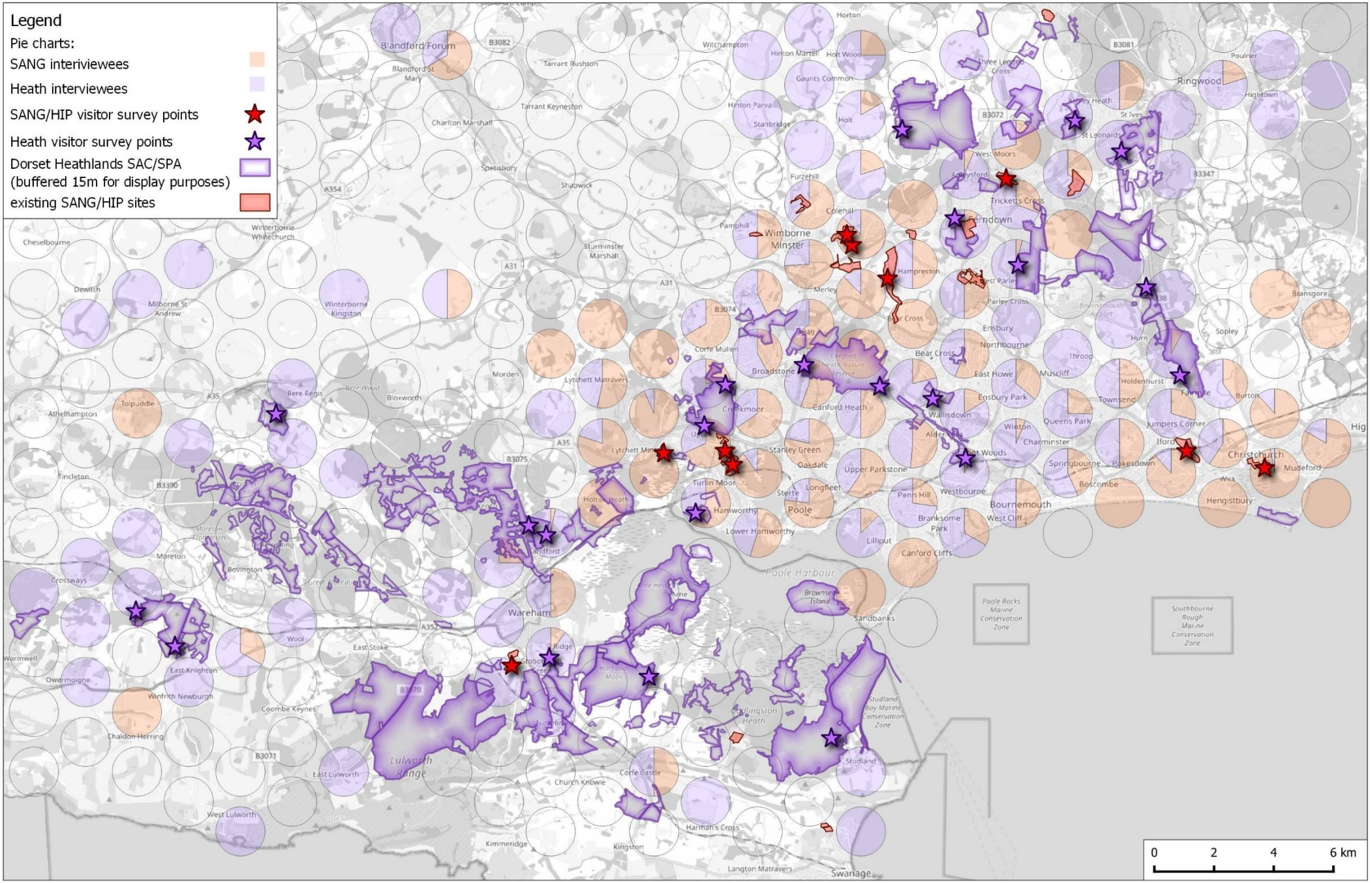
Map 12: SANG/HIP visitor postcodes and convex hulls around the closest 75%. Convex hulls for sites with more than one survey are labelled with the year.



Map 13: Distribution of interviewee home postcodes from visitor surveys at specific survey points on the SAC/SPA and on SANG/HIP sites.



Map 14: Distribution of interviewees from visitor surveys at specific survey points on the SAC/SPA and on SANG/HIP sites. Interviewees are summarised using a 2 km hexagonal grid, with a central pie chart used to indicate the proportion of SANG/HIP vs heath interviewees in each cell.



How do HIPs/SANGs as a network relate to housing?

2.78 In Table 12 we summarise the 75th percentile for each SANG (i.e. the distance within which the majority – 75% - of visitors originate) and the amount of housing within that distance of the SANG. We also summarise the level of housing change within that distance since the SANG was established. The data clearly show SANGs catchments have encompassed areas where new housing has come forward, for example there has been a 9.1% increase in housing around BytheWay. By way of a caveat, these catchment figures need to be treated with some caution as they are based on initial visitor data and use of SANGs may change over time as they become more established, better promoted etc. As such the catchments may change over time.

Table 12: Summary of housing growth within the catchment area of each SANG. Catchment size taken as the most recent figure (and average of the two 2018 Upton Country Park surveys).

Site name	75th percentile	Operational since	Number of houses within 75th percentile catchment			
			At year of opening	In 2021	Increase (%)	Increase (%) per annum
Bog Lane	11.6	2017	33,360	34,600	3.7	0.93
BytheWay	1.9	2012	7,593	8,283	9.1	1.01
Canford Park	3.8	2019	41,410	42,059	1.6	0.80
Frenches Farm	1.5	2018	3,247	3,262	0.5	0.17
Stanpit Riversmeet SANG	2.8	2012	22,707	23,840	5.0	0.56
Upton Country Park	4.7	2015	46,261	48,294	4.4	0.73
Woolslope	0.4	2013	924	946	2.4	0.30

2.79 Map 15 shows the distribution of existing open SANG and HIP sites with the 3.9km buffer (the average 75th percentile) applied to all sites. The locations with the most housing growth are also shown on the map (500m grid cells with more than 50 houses between 2007 and 2021).

2.80 The use of 3.9km as a standard catchment over-simplifies the data, however it provides easy visualisation of the likely draw of each site. There are 216 grid cells with more than 50 houses within the 5km Dorset Heaths SAC/SPA buffer (totalling 25,690 new houses in these cells only) and of these 153 (17,440 houses in these cells) are located within the 3.9km buffer – 71% of the grid cells with large increases. From Map 15, within 5km of the Dorset Heaths, it can be seen there are gaps in the current SANG network to the south-east of the BCP conurbation (central

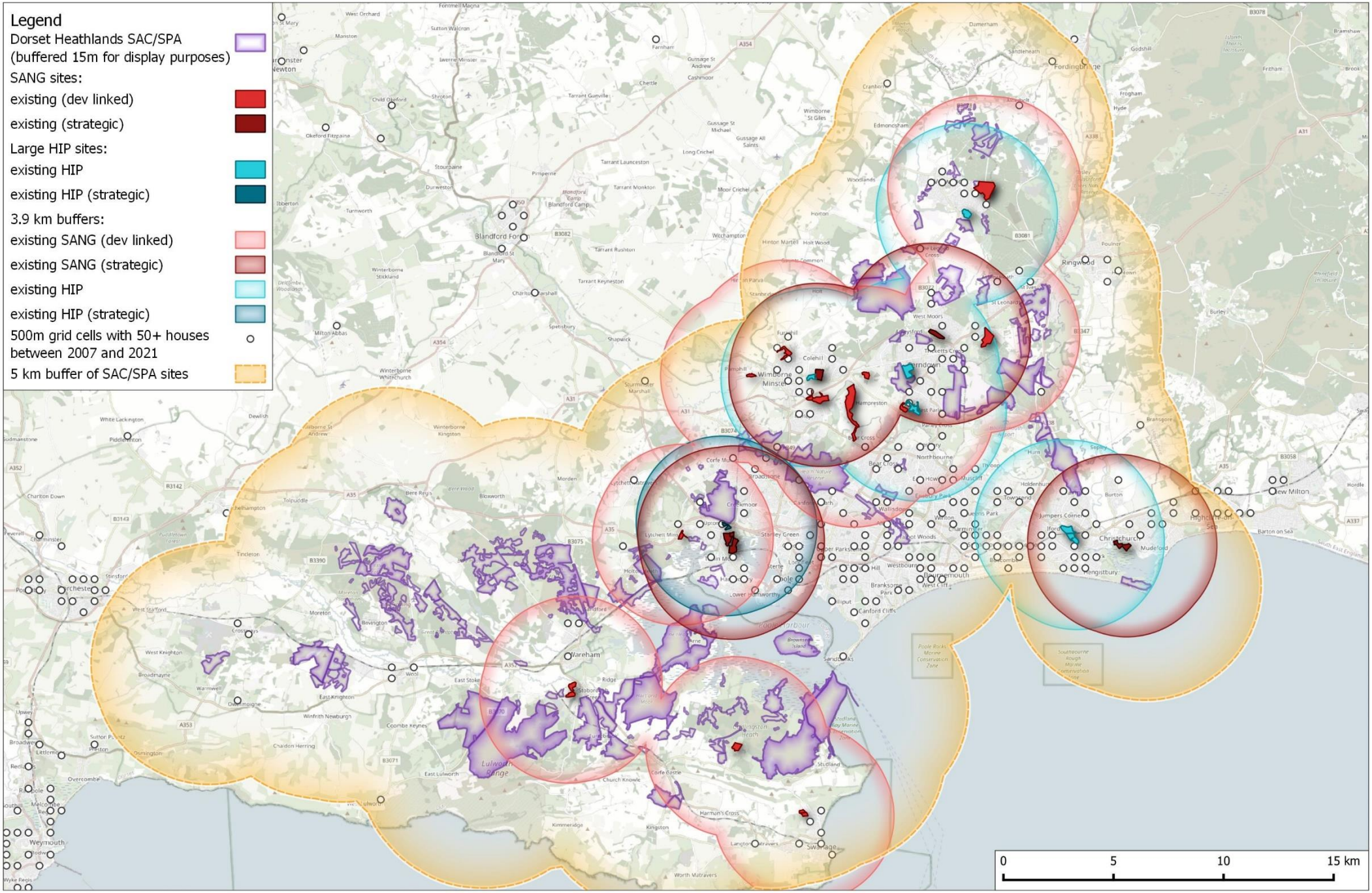
Bournemouth, Branksome, Canford Cliffs etc.) and towards the north and west of Purbeck. However, it should be noted that there has been relatively little housing growth in Purbeck and future SANGs have been identified for some of these locations (see Map 10).

.

HIPS/SANG network in relation to housing growth

The SANGs catchments appear to provide a good match to where housing growth has come forward. Those areas with limited SANG provision (e.g. around the north and west of Purbeck) are areas where there has been relatively little housing growth. New housing growth particularly around central Bournemouth, Branksome, Canford Cliffs has been outside the scope of any SANG/large HIP project (based on these 3.9 km buffers) – but there are a number of smaller HIP projects that have been established in this area (see Map 10).

Map 15: Distribution of open SANG and HIP sites with a simple 3.9 km buffer catchment around each site and location of key housing growth.



How do numbers of people on HIPs/SANGs relate to housing change?

Vehicle counts

2.81 Vehicle counts have been undertaken by UHP across the Dorset Heaths on a regular and consistent basis since 2010. The counts involve a small team, each driving a different route and counting all parked vehicles at pre-determined locations, that include the SAC/SPA heaths, SANGs/HIPs and a range of different parking locations. The counts are repeated through the year (14 counts per year on set dates/times of year). The counts cover 266 different parking locations (with around 3391 spaces)[18].

2.82 Vehicle count data from selected SANGs are shown in Table 6, covering different years. The data suggest an increase in use over time, very clearly so for Upton Country Park SANG and the Stoborough SANG (at Bog Lane).

Table 13: Average number of vehicles recorded on a transect in each financial year for the six SANG sites. Number of spaces at each SANG parking location are shown in brackets. Grey cells and bold text indicate the highest value in each column.

Financial Year	Burnbake SANG 1 [4]	Bytheway Field 1 [24]	Canford Park SANG* [50]	Frenches Farm SANG [7]	Stoborough SANG 1 [8]	Upton Country Park SANG 1 [28]
14-15	-	7.0			0.5	-
15-16	0.3	6.2			0.4	8.8
16-17	**0.6**	8.9			0.4	12.2
17-18	0.1	**9.3**			0.9	17.6
18-19	0.1	8.4		1.9	0.4	17.8
19-20	0.3	9.0	10.6	**2.4**	**1.0**	**18.4**

* included from early June 2019

2.83 The vehicle count data show a significant positive correlation between the number of vehicles counted on SANGs and the number counted on 'core' heaths (data from 2014-2020, 72 counts with data from SANGs and heaths, heath sites used were those 'core' sites without access to beaches, coast or harbour and those without visitor centres etc.). Rank Spearman Correlation Coefficient = 0.487, $p<0.0001$). This indicates that when there are more visitors on the heaths there also tend to be more visitors on the SANGs. Moreover, there is some suggestion that over time the

[18] Note that this total for the number of spaces does not include some locations such as Ferry Road at Studland where parking capacity is hard to define as there is extensive roadside parking. Note that in 2007 we estimated there were 277 locations with parking around the Dorset Heaths and a total of 5,215 parking spaces. The actual list of locations covered in the car park counts is more focussed around the key areas of heaths.

proportion of vehicles counted on the SANGs has increased relative to the counts on the heaths (see Figure 6). For the 2019-20 financial year the number of vehicles counted on SANGs was on average 61% of the total parked on the 'core' heaths.

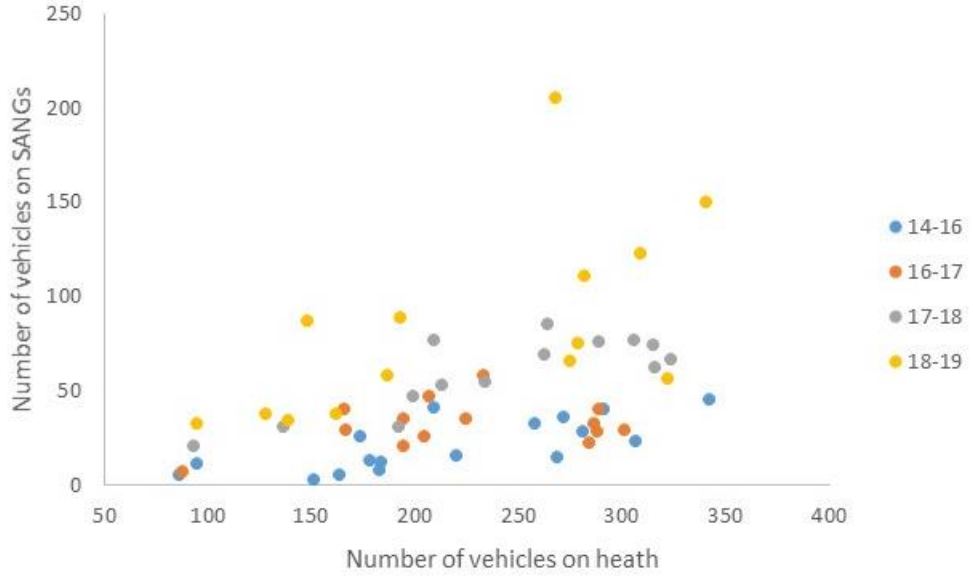


Figure 6: Scatterplot showing vehicle counts on SANGs in relation to those on heaths. Heath data for core heath sites only, i.e. excluding heaths visitor centres and heaths with access to beaches, coast, harbour or other attractions. Colours reflect different financial years (only years with SANG data collected included, there were limited counts in 2014-15 and therefore those data merged with 2015-16).

Sensor database

2.84 The sensor database, running since 2007 collected a total of 226,834 cleaned complete days of data, across 137 sensors - an average of 1,656 days of data for a sensor (c. 4.5 years). However, the sensor data are patchy (see Appendix 4 for details) meaning analysis and comparison is complex.

2.85 Individual parking locations and individual sensors in the sensor database were categorised according to the type of access and type of site to facilitate comparison. The sensor data are summarised by heath and by type in Table 14. It is important to note that the values in the table are sometimes from a single sensor or small number of sensors on specific access points and these may not necessarily be the busiest access points or representative of the site as a whole. As such, values give an indication of the levels of access but not necessarily the full picture. The values highlight the variation between sites and different types of sites and access within sites. It should also be noted that the list includes 2 SSSI sites which have adjacent areas of HIP supporting land, for which a sensor has been fitted.

Table 14: Summary of the average number of passes per day from sensors at different sites. Created from an annual average across all years of available data. Multiple sensors are grouped for the HIP/SANG sites, but values for separate sensor/s are given depending on the type of access. Average values are then presented in the columns for specific types of sensors, which can include multiple types on a single site.

Site	Number of sensor	Heathland	Heathland& Other	HIP	HIP& Other	HIP(& heathland)	SANG	Visitor attractions
SANG								
Upton Country Park (inc. SANG)	12						16.8	15.4
Stanpit Riversmeet SANG	1						9.6	
Woolslope	1						2.3	
Bog Lane	2						1.0	
Burnbake	1						0.1	
SSSI – with adjacent HIP								
Bourne Valley	9	4.0	12.7			1.7		
Stoborough & Creech Heaths	6	1.3				1.8		
HIP								
Moors Valley - Potterne Park	1			19.5				
Holes Bay	1			14.3				
Riversmeet – Two Riversmeet Arena	2			7.7				
Stour Valley	5			6.6				
Poor Common	1			6.1				
Stanpit	1			4.0				
Delph Woods	2			3.3				
Chewton Bunny	2			2.4				
Broadstone Heath	1			2.0				
Nea Meadows	1			0.0				
HIP & Other								
Pugs Hole	1				1.4			
Meryrick Park	2				2.2			

Visit estimates

2.86 Estimates for the total number of person visits for HIPs/SANGs and figures for the amount of housing change are given in Table 15. The visits have been estimated using tally and vehicle count data (see the notes column in Table 15).

2.87 These estimates are crude and potentially underestimate levels of use markedly, as the data are derived from counts of cars or counts of people at specific entry points (rather than all entry points). For some individual sites there are more detailed

estimates[19], however we have used broadly consistent data in the table derived solely from tally counts and/or vehicle counts which will typically reflect the main entry points (but not necessarily all).

2.88 It can be seen that, together, the HIPS/SANGs are providing around 253.1ha of land for access and are used by around 466.6 people per hour (possibly much more).

2.89 This figure can be placed into context with an estimate of the number of heathland visits that HIPs/SANGs might need to deflect based on the amount of housing change that has taken place since 2007. In 2007 we estimated around 15,000 people visited the Dorset Heaths per day in August (Liley et al., 2007). Since 2007 the amount of housing within 5km of the heaths has increased by 5.7% (see para 2.22). If visitor use were to have increased in proportion to housing change, then we might expect a further 855 (i.e. 5.7% of 15,000) person visits to the heaths per day in the absence of any alternative sites/mitigation. With a 12 hour day, 855 is around 70 people per hour and our figure of 466.6 per hour visiting HIPS/SANGs therefore compares well and would suggest SANGs are drawing a higher level of access that they were anticipated to provide. It is important to caveat these figures to note that a proportion of visitors to HIPS/SANGs will not necessarily visit heaths and there has been a general trend for people to visit the countryside more – as such for HIPs/SANGs to be deemed effective as mitigation we would expect to see many more visits to SANGs than the relevant increase in housing (and this is what the data show).

2.90 In Figure 7 we show visit rate to SANGs in relation to both the current weighted housing and also the housing increase 2007-21. Both plots show a strong correlation between the measures of housing and SANG use (albeit very much driven by the outlier of Upton Country Park), suggesting that use of SANGs is related to the amount of housing nearby – in other words sites with more housing around them have more use.

[19] For example, detailed collation of different data for Riversmeet and Stanpit SANG suggested visitor numbers of around 38.7 people per hour (Panter and Caals, 2020c). This compares to 14.2 people per hour given in the table.

Table 15: HIPs/SANGs and housing change within 5km. Areas have been estimated for sites which were given as point locations.

Site name	Area (ha)	Year of opening	Housing increase within 5km radius since year of opening	Person visits per hour (estimated case by case from vehicle and tally)	How the estimate has been derived
Bog Lane SANG	14.1	2017	186	2.1	Max of tally count and vehicle count
Burnbake SANG	10.0	2015	130	0.5	Vehicle count only available
Bytheway Field SANG	14.7	2012	1,567	19.0	Average of tally count and vehicle count
Canford Park SANG	52.1	2015	3,410	15.3	Average of tally count and vehicle count
Delph Woods HIP	38.0		n/a*	29.9	Vehicle count only available
Frenches Farm SANG	4.8	2018	785	10.3	Max of tally count and vehicle count
Granby Road HIP	1.5		n/a*	37.7	Vehicle count only available
Potterne Park HIP	11.1	2010	886	162.3	Vehicle count only available
Upton Country Park SANG	33.6	2015	7,356	162.3	Sum of all tally counts Phase 1 and Phase 2
Iford HIP	26.2	2018	5,382	4.9	Tally count only available
Riversmeet & Stanpit SANG	13.4	2012	2,747	14.2	Tally count only available
South of Leigh Road East SANG	16.8	2021	1,567	3.2	Tally count only available
Upton Woods HIP	5.2	2008	2,221	5.3	Tally count only available
Woolslope SANG	11.6	2013	1,456	6.0	Tally count only available
Total	**253.1**			**466.6**	

*no site boundary so increase not calculated

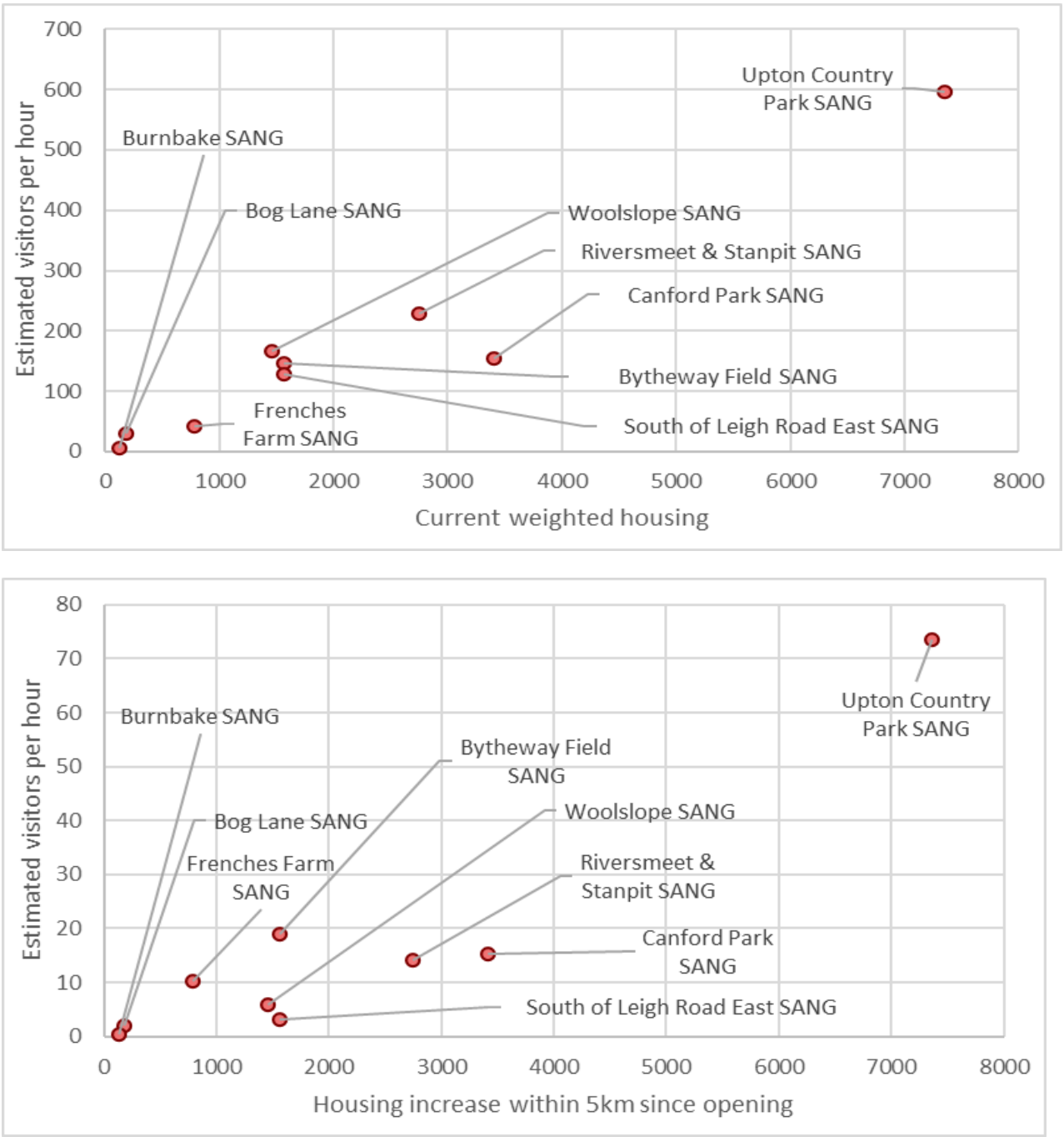


Figure 7: Estimated visitors per hour (see text for details) per SANG in relation to current weighted housing (top) and the increase (since SANG opened) in the number of houses within a 5km radius (lower). Pearson correlation coefficients: 0.947 (top) and 0.936 (bottom), p<0.001 in both cases

Change in use over time from sensors

2.91 SANGs are clearly well used and often busy. In addition, there is some indication that the use of these sites has often been increasing year on year (as also reflected by vehicle count data). Figure 8 shows the annual average number of passes per

day in weeks 8-12 annually for each year in the dataset[20]. While the time span available is limited for some sites, sensors at Upton Country Park and, Bog Lane tend to show an increase in use over the period shown. Data from more sites over a longer time period are necessary to understand the variation and scale of change in more detail.

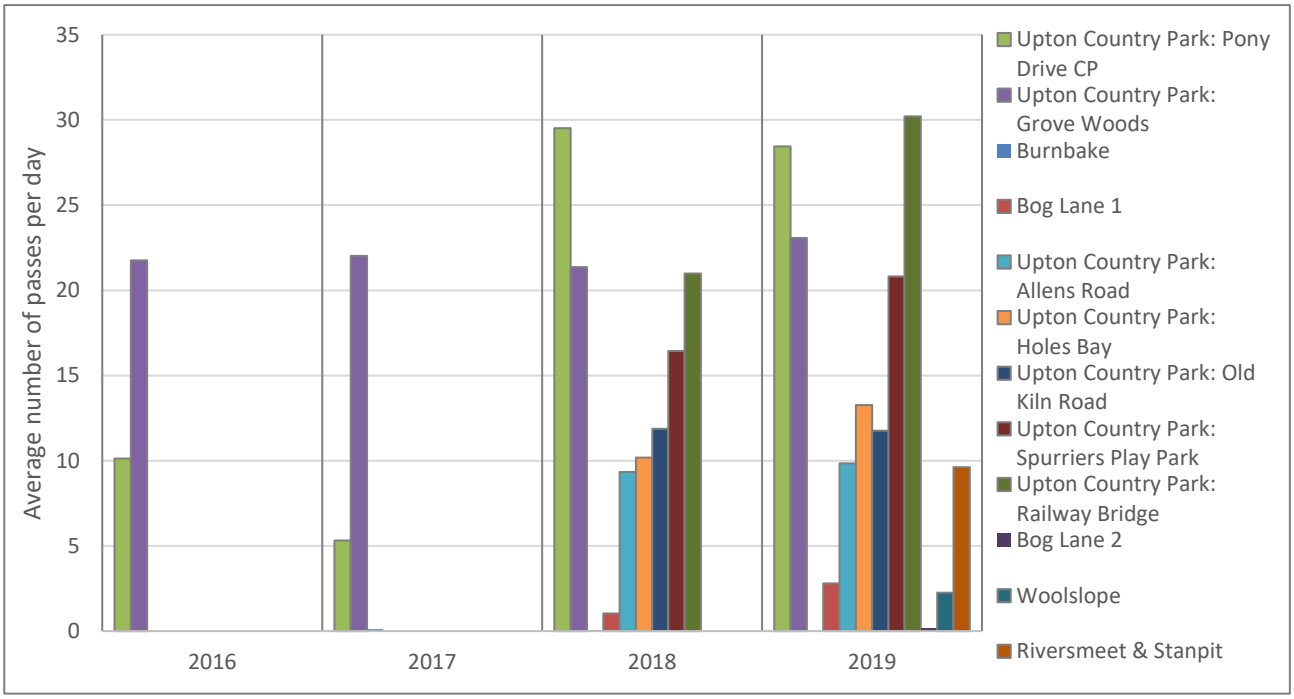


Figure 8: Averaged number of passes per day at each sensor with data. Using data from data for weeks 8-12 of the calendar year (roughly March, the month with the most sensor data)

Numbers of people on HIPs/SANGs relate to housing change

Vehicle counts and sensor data indicate use of individual SANGs have increased over time, particularly so for Upton Country Park and for Bog Lane. The vehicle count data show a significant positive correlation between the number of vehicles counted on SANGs and the number counted on 'core' heaths, indicating that when there are more visitors on the heaths there also tend to be more visitors on the SANGs. There is also some suggestion that over time the proportion of vehicles counted on the SANGs has increased relative to the counts on the heaths.

Visit rates on SANG sites correlate with the weighted housing variable and with the amount of housing change (2007-21) within 5km, suggesting that use of SANGs is related to the amount of housing nearby.

[20] Weeks 8-12 represent roughly the month of March (when there was most data) and we have adjusted to a weekly basis to correct for any variation (as there were still gaps), with averages calculated for each week where there was a full week of data

What is the distribution of the existing HIPs/SANGs network?

2.92 The distribution of the HIP/SANG sites is shown on Maps 16-18.

2.93 Holt and West Moors, Canford Heath and Slop Bog & Uddens Heaths all have large areas of SANG in close proximity and the following sites all have more than 100ha of SANG within a 5km radius of the heath:

- Town Common (101.0ha of SANG, 6 different SANG)
- Bourne Valley (102.3ha of SANG, 6 different SANG)
- Turbary and Kinson Commons (108.5ha of SANG, 7 different SANG)
- Parley Common (125.0ha of SANG, 7 different SANG)
- Corfe & Barrow Hills (160.8ha of SANG, 11 different SANG)
- Ferndown Common (167.7ha of SANG, 11 different SANG)
- Slop Bog and Uddens Heath (170.3ha of SANG, 11 different SANG)
- Canford Heath (178.5ha of SANG, 12 different SANG)
- Holt and West Moors Heaths (201.5ha of SANG, 13 different SANG)

2.94 Map 16 shows the distribution of access points (for heaths and HIPs/SANGs) in relation to housing change

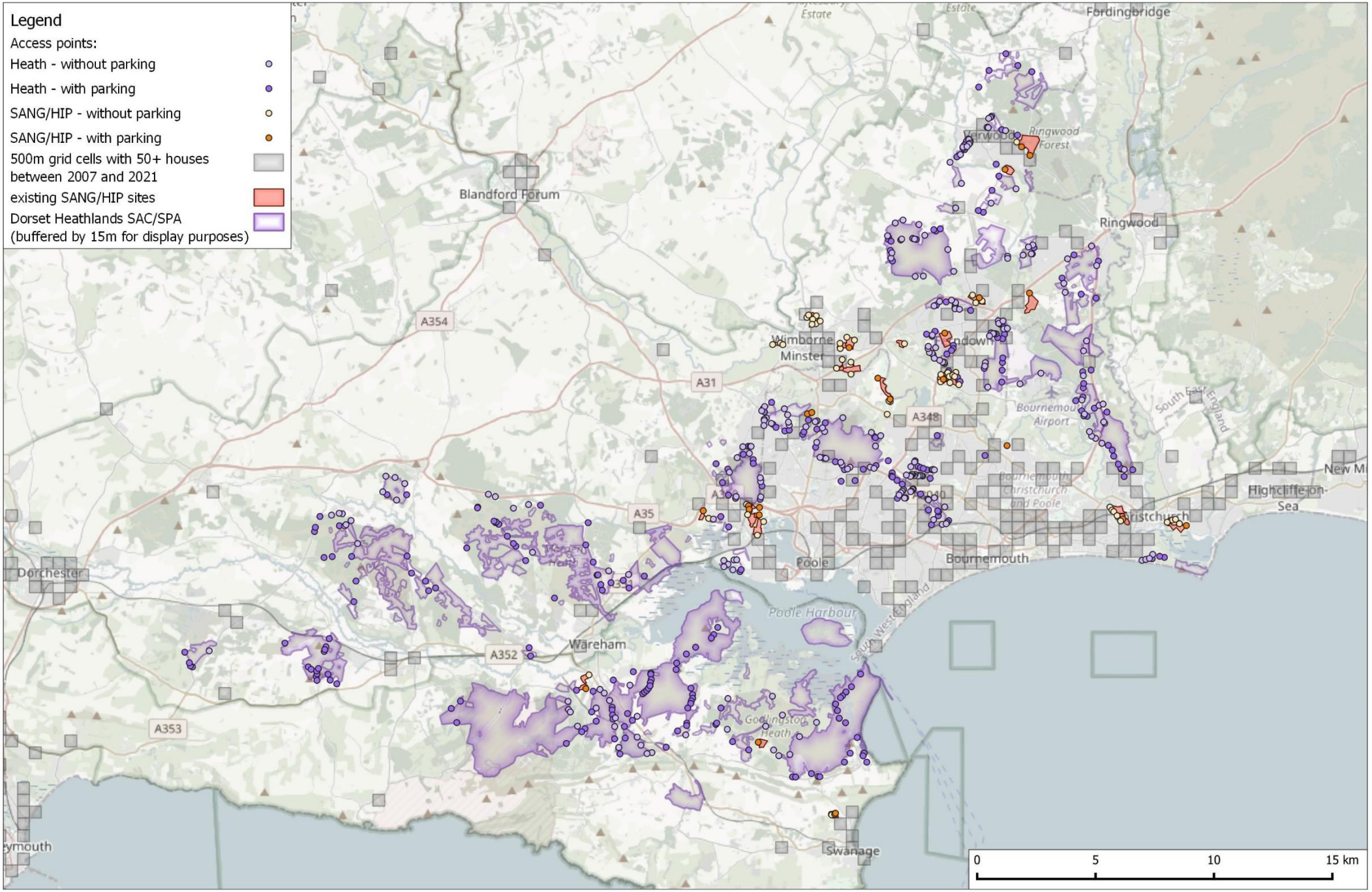
2.95 Using only the parking locations we created a series of Voronoi polygons to identify the areas closest to particular SANGs and heath car parks (Map 17). Voronoi polygons represent the area that is closest to that given point, and if we assume straight-line distance were the only factor determining where people choose to visit (i.e. people would visit the parking location closest to where they live), the Voronois would define the catchment for each car park. The areas within the purple Voronois are therefore those areas where the nearest car park is on a heath whereby the orangey colour identifies those areas where the nearest parking location is on a SANG rather than a heath. The same Voronoi polygons (HIPs/SANGs only) are shown in Map 18, alongside the SANG visitor postcodes. This highlights that people will clearly travel from outside a Voronoi to visit a HIP/SANG – attractiveness and ease of access will clearly influence the draw of sites and furthermore people are likely to visit more than one location, potentially choosing a range of sites to visit for their chosen activity. As such the Voronois are useful in considering the SANGs in relation to the Heaths, but should not be assumed to represent definitive catchments.

2.96 Map 17 indicates that parts of Poole (towards the south-east), Bournemouth (towards the west) and parts of Purbeck (particularly the north) are the key areas where there is currently limited HIP/SANG provision in relation to the heaths. The map also indicates that large areas of land around Wimborne are well served by SANG/HIP sites.

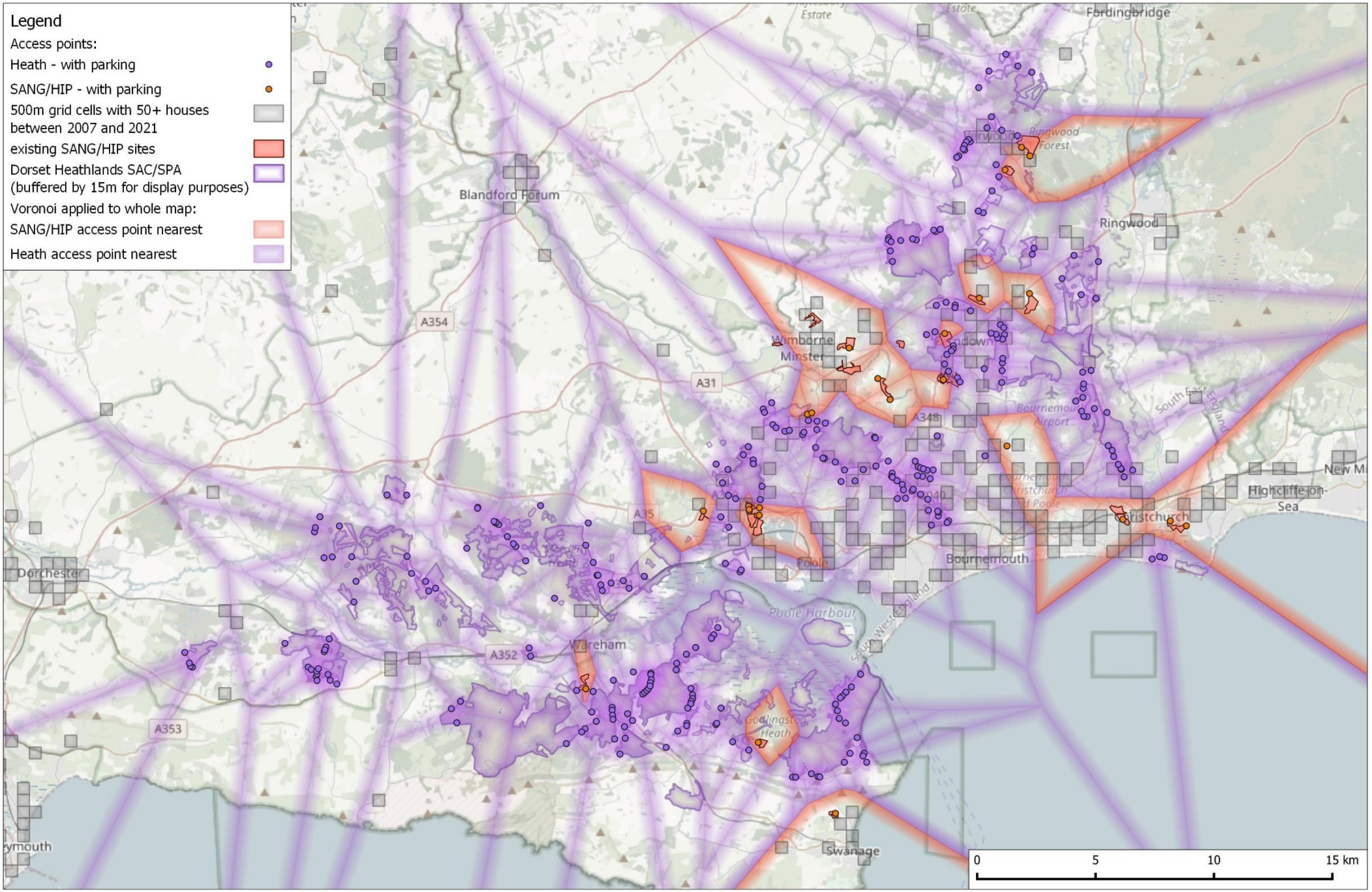
Current distribution of HIPS/SANG in relation to the heaths

Town Common, Bourne Valley, Turbary & Kinson Commons, Parley Common, Corfe & Barrow Hills, Ferndown Common, Slop Bog & Uddens Heath, Canford Heath and Holt & West Moors Heaths all have large areas of existing SANG nearby (at least 100ha within 5km) and multiple SANG sites. Map 17 indicates that parts of Poole (towards the south east), Bournemouth (towards the west) and parts of Purbeck (particularly the north) are the key areas where there are currently limited SANG provision.

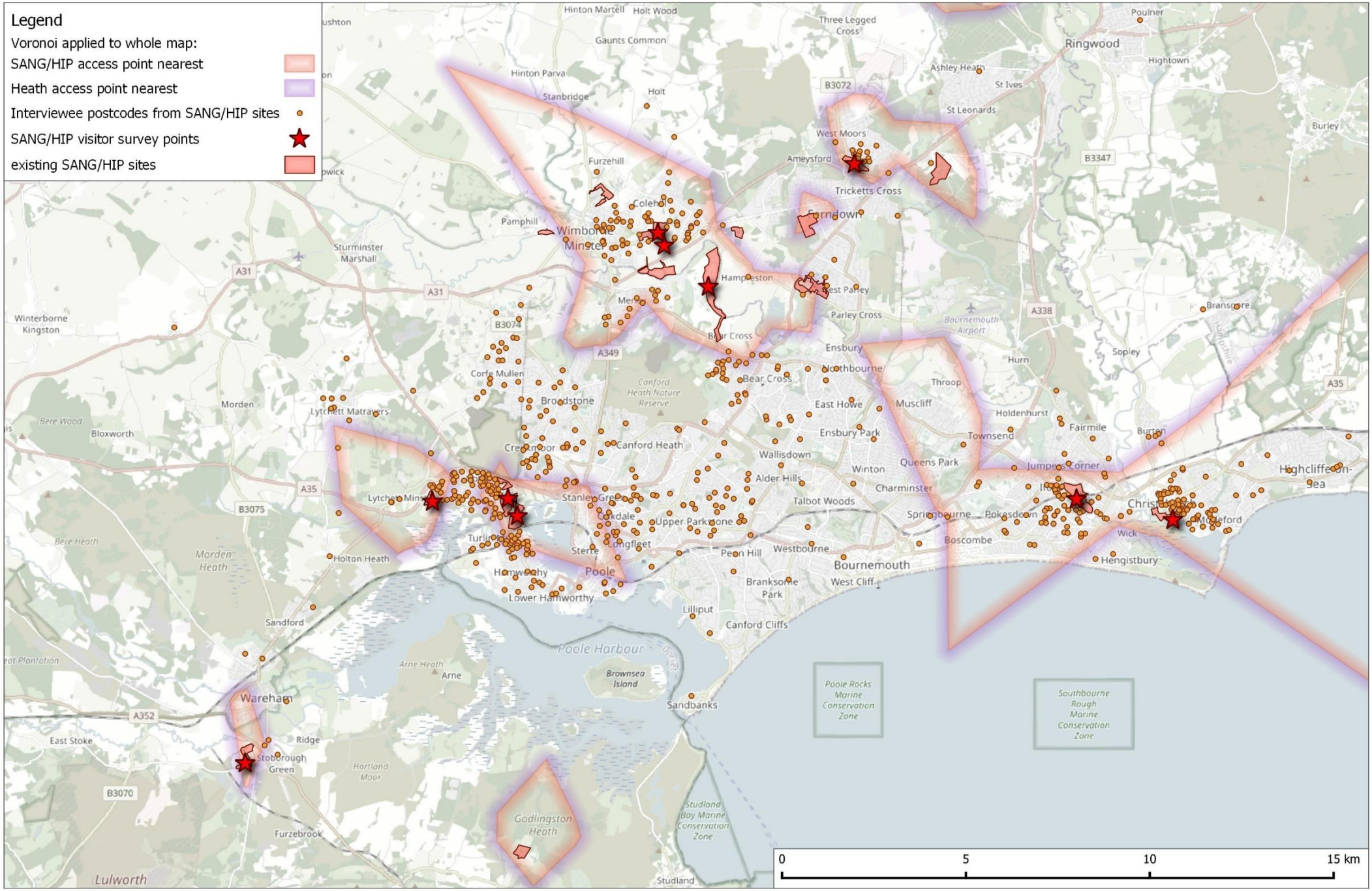
Map 16: The distribution of access points into Dorset Heaths SAC/SPA or SANG/HIP sites, overlaid with past housing growth.



Map 17: Voronois to show nearest (based on linear distances) heath or open SANG/HIP access points (with parking) and location of past housing growth.



Map 18: Voronois to show nearest (based on linear distances) heath or open SANG/HIP access points (with parking) and SANG/HIP interviewee postcodes.



How does the visitor profile on HIPs/SANGs compare to heaths?

Questionnaire data

2.97 Some of the previous sections show overlap between SANGs and Heaths in terms of recreation use. For example, the postcode data show a clear spatial overlap, the distances people travel to SANGs are often similar and clearly SANGs are used by Dorset Dogs members who also visit the heaths (see paragraph 2.39 for details).

2.98 Questionnaire data are available for a range of SANG sites, as summarised in Table 18 alongside similar metrics for the heaths (from the 2019 visitor survey). The table highlights marked variation between SANGs, for example the % of interviewees arriving by car ranges from 7% (Woolslope) to 87% (Canford SANG). This compares to 52% from the Heaths.

2.99 Some sites have very high levels of use by dog walkers (a key target audience),with virtually all interviewees at some sites (such as Frenches Farm), visiting to walk their dog. At some sites there were more dogs than people (Upton Country Park P1 and BytheWay), with the ratio of dogs to people for many SANGs much higher than that on the heaths.

2.100 Data from the 2019 visitor surveys on the Dorset Heaths (Panter and Caals, 2020a) provides further evidence of the overlap between the heaths and HIPs/SANGs. Across all interviewees in the 2019 survey, 7% named a HIP/SANG as an alternative site that they also visited (for the same activity they were undertaking on the heath on the day of the interview). Note that some HIPs/SANGs (such as Canford Park) were not necessarily fully operational or established as visitor destinations. HIPs/SANGs were particularly frequently cited as alternative destinations for interviewees at the core urban heath sites (Upton, Canford and Turbary). Overall, 14% of interviewees stated all of their visits (for their given activity) took place at the survey location (i.e. they only ever visited the heath where interviewed), and around a third (31%) of interviewees stated that the current site was used for around three quarters or more of their visits.

2.101 Table 16 provides further detail from the Dorset Heaths survey, showing interviewee responses regarding the alternative sites they visited. The amount of SANG provision around each site is also given. The ranking in the table reflects the percentage of interviewees on each heath naming a SANG as an alternative. It can be seen that Ham Common, Canford Heath and Upton Heath were the sites with the highest percentages of interviewees naming a SANG as an alternative; these sites also had relatively low percentages of interviewees naming a heath as an alternative and have relatively large areas of SANG (or weighted area of SANG) around them. For comparison the data shown in Table 17 gives the alternative destinations named by those interviewed at SANG/HIP sites. The percentage of

interviewees who named other SANGs(/large HIPs) is also given, along with designated heaths, parks and beaches. . Ilford Playing Field and Bog Lane are notable in that nearly 50% of interviewees at those two sites named a heath as the alternative location they would have visited. Overall, across the 6 sites, 6% of interviewees named another SANG (/large HIP) as an alternative destination, while 24% listed a heath site. From the surveys on the heaths the comparable overall figure was 7% naming a SANG (/large HIP) and 25% another heath site.

Table 16: Summary of interview data from the Dorset Heaths visitor survey (Panter and Caals, 2020a) showing the percentage of interviewees who named SANGs or other designated heaths as alternative locations they would have visited. These values are shown alongside information extracted on the SANG provision around sites.

SSSI	% interviewees naming a SANG/large HIP as an alternative	% interviewees naming a heath as an alternative site	Total number of SANG&largeHIP within 5km	SANG&largeHIP area (ha) within 5km	Total weighted SANG &large HIP area
Black Hill Heath	0%	13%	0	0	0
Lions Hill	0%	17%	5	112	8.0
Winfrith Heath	0%	6%	0	0	0.0
Hartland Moor	1%	32%	2	24.	1.3
Parley Common	1%	25%	7	100	21.7
St Leonards and St Ives Heaths	1%	16%	7	109	9.3
Town Common	1%	21%	4	65	6.8
Bourne Valley	2%	10%	5	57	1.3
Stoborough & Creech Heaths	2%	22%	1	14	14.3
Studland & Godlingston Heaths	2%	2%	2	16	11.3
Morden Bog and Hyde Heath	3%	16%	2	19	0.8
Ferndown Common	4%	31%	12	149	44.8
Turbary and Kinson Commons	4%	15%	7	83	2.8
Cranborne Common	5%	2%	2	56	11.3
Holt and West Moors Heaths	6%	19%	14	204	28.6
Ham Common	10%	10%	3	44	16.7
Canford Heath	11%	11%	13	151	6.5
Upton Heath	12%	12%	5	49	32.2

Table 17: Summary of interview data from SANGs/Large HIP sites and the percentage of interviewees who named SANG/HIPs, other designated heaths or parks and beaches as alternative locations they would have visited.

SANG/HIP	Year of survey	n	% interviewees naming a SANG/ large HIP as an alternative site	% interviewees naming a heath as an alternative site	% interviewees naming a park as an alternative site	% interviewees naming a beach as an alternative site
Upton Country Park SANG	2015-18	361	1%	14%	13%	15%
Iford Playing Fields HIP	2019	70	1%	46%	12%	23%
Bog Lane SANG	2017	12	3%	47%	0%	0%
Riversmeet & Stanpit	2019	75	3%	35%	6%	21%
Canford Park SANG	2019	62	12%	15%	11%	7%
Frenches Farm SANG	2018	44	26%	4%	6%	8%
Total			**6%**	**24%**	**10%**	**14%**

Table 18: Summary of visitor profile for HIPs/SANGs compared to the heaths. 'opening' refers to sites which may have already had public access. Top two values in each column are in bold.

	Date of survey	Year relative to 'opening'	n	% arriving by car	% visiting daily (or more freq)	% dog walking	% member of Dorset Dogs	Mean group size*	Number of dogs per person (entering)*	Median route length (km)
DORSET HEATHS	**summer 2019**	**n/a**	**946**	**52%**	**30%**	**74%**	**6%**	**1.53**	**0.63**	**2.3**
Canford SANG	summer 2019	0	62	**87%**	15%	87%	**15%**	1.73	0.90	2.3
Iford HIP	autumn 2019	0	70	50%	50%	83%	7%	1.39	0.70	-
Riversmeet & Stanpit	summer 2019	0 (/5)		55%	**52%**	**91%**		1.33	0.64	2.0
Upton Country Park -P1	summer 2018	2/3	127	**79%**	26%	88%	**13%**	1.88	**1.08**	
Frenches Farm	spring 2018	0	44	36%	43%	**98%**	9%	1.37	0.86	1.0
South of Leigh Road East	autumn 2018	-1	22	45%	23%	55%	9%	1.55	0.53	**2.9**
Upton Country Park -P2	spring 2018	1	101	55%	30%	69%	8%	1.67	0.44	
Bytheway	winter 2017/18	5	68	62%	23%	72%	-	**5.16**	**1.33**	
Upton Woods	summer 2018	10	-	-	-	-	-	1.50	0.44	
Bog Lane	2017	0	12	75%	17%	83%	8	1.27	0.84	1.1
Stanpit	winter 2016	2/3	53	51%	32%	66%	-	n/a	0.52	
Upton Country Park -P1	summer 2015	1	133	68%	33%	77%	8%	**2.34**	0.45	**2.6**
Woolslope	winter 2013/14	0	14	7%	**64%**	64%	-	2.21	0.81	
Bytheway	winter 2012/13	0	28	18%	32%	79%	-	-	-	
Woolslope	winter 2012/13	-1	13	15%	-	-	-	-	-	
Potterne Park	summer 2012	2/3	80	68%	-	-	-	-	-	
Stanpit	autumn 2012	-1	11	64%	-	-	-	-	-	

* from tally counts

Sensor data

2.102 The visitor profile at sites can also be inferred from other data such as hourly levels of use recorded in the sensor database. The hourly number of passes averaged across the whole dataset for each sensor and then averaged for each Dorset Heath SSSI is shown in Figure 9. This shows that levels of access on the heaths vary markedly – (note that the sensors represent limited spatial coverage with the data from a selection of very specific points). However, almost all these heathland sites (except perhaps the single site of St Leonards and St Ives), show a bimodal distribution, with two peaks of access – one around 9am and a second around 4pm (variations are likely to be due to the contribution of seasonal data to the overall average). These peaks reflect a signature pattern resulting from high levels of dog walker use in particular.

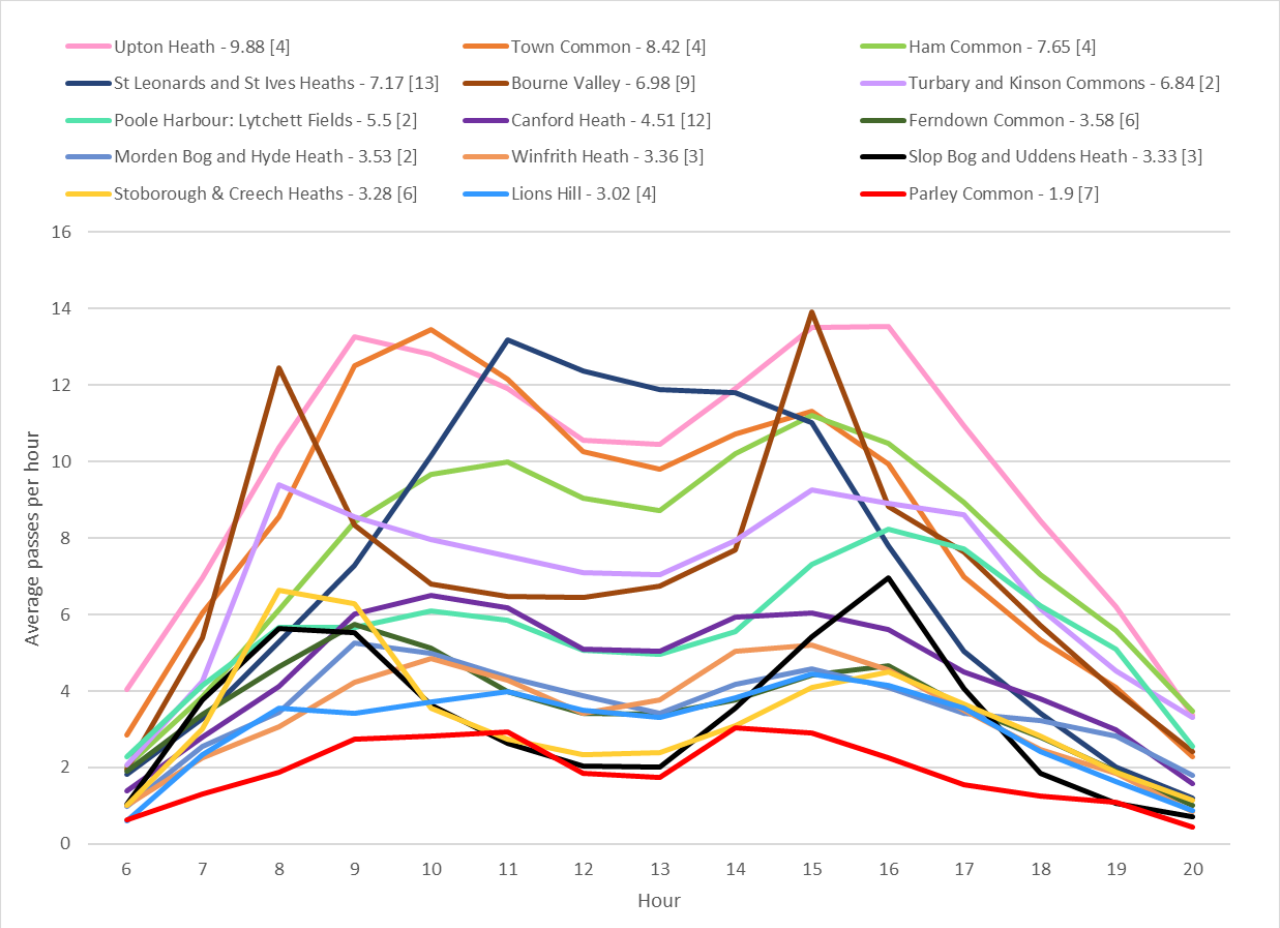


Figure 9: Hourly average number of passes for heathland sensors by SSSI between 06:00 and 21:00. Data are compiled from all data, from an average of 2009 to 2015 (the period with most data) and 2018 to 2020 (to include recent trends and sensors)) One SSSI not shown, Christchurch Harbour, which covers all Hengistbury Head heathland sensors, values for this sensor between 6:00 and 21:00 average 51 passes per hour. For each SSSI name in the legend the average number of passes between 6:00 and 21:00 is given and the number of sensors used in brackets.

2.103 Data for different types of sensors are shown in Figure 10. The grouped 'heathland' sensors show the strongest bimodal distribution, these are sensors where recreation use will not be influenced by other types of habitat, visitor facilities or attractions (such as cafes). For comparison the sensors categorised as visitor attraction sites (such as the play area at Avon Heath Country Park and the formal part of Upton Country Park) show almost no bimodal distribution. These are locations where use is more likely to be centred around day visitors, families etc. The sensors at heathland sites with other attractions (such as the beach at Ham Common or parts of Avon Heath Country Park) appear to peak late morning and have a high, flat profile across the middle of the day. These are locations where there are potentially other draws besides the heath alone. The SANG and HIP sensors overall show a bimodal distribution and in particular the SANG ones show a strong level of early morning use, very similar to the heathland ones.

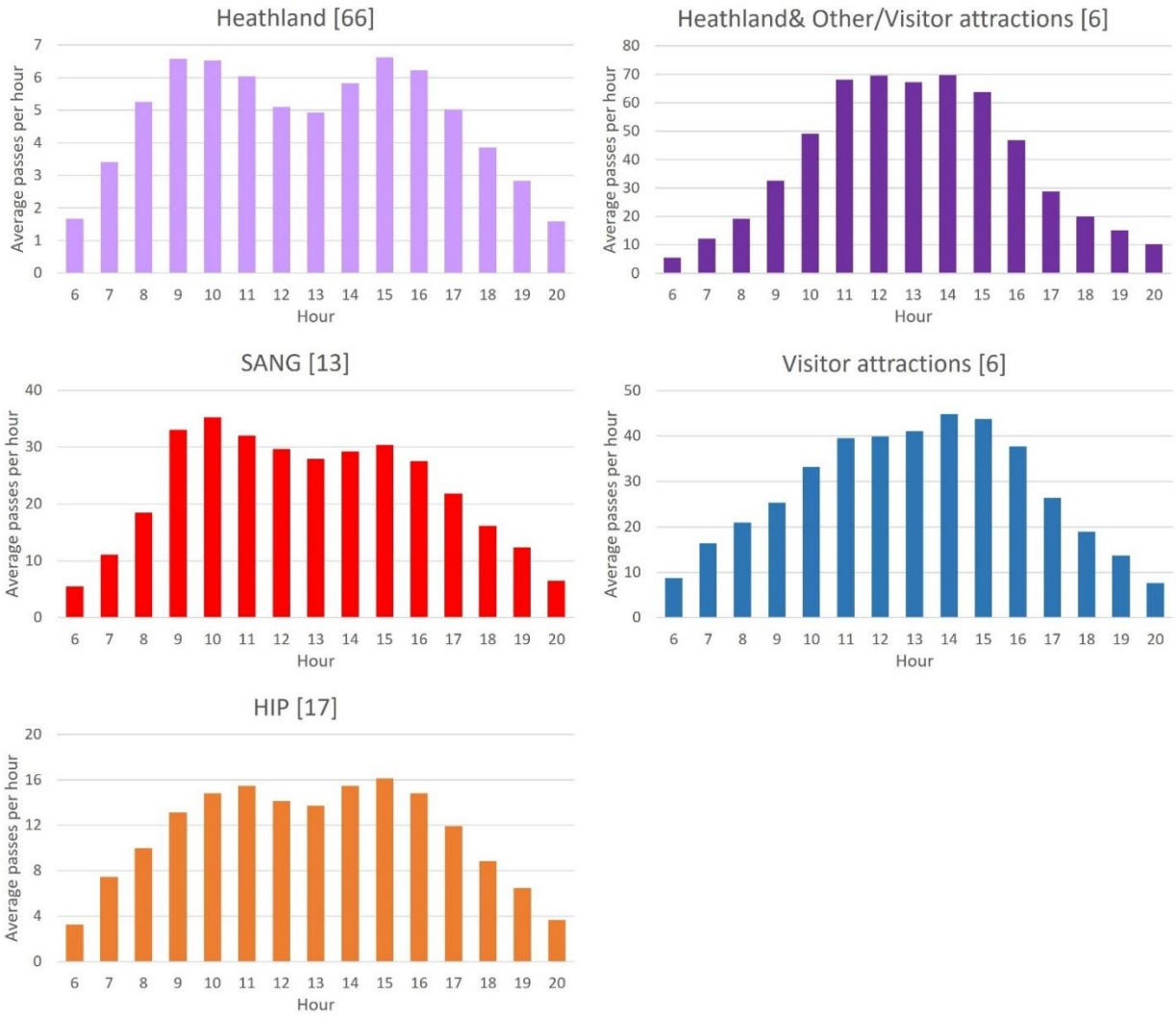


Figure 10: Average number of daily passed averaged across all sensors in each sensor type. Value in brackets shows the number of sensors with available data used to produce the plot.

2.104 Individual SANG/HIP sites are shown in Figure 18, highlighting the bimodal distribution and allowing different sensors to be compared. The bimodal pattern is consistent across sites.

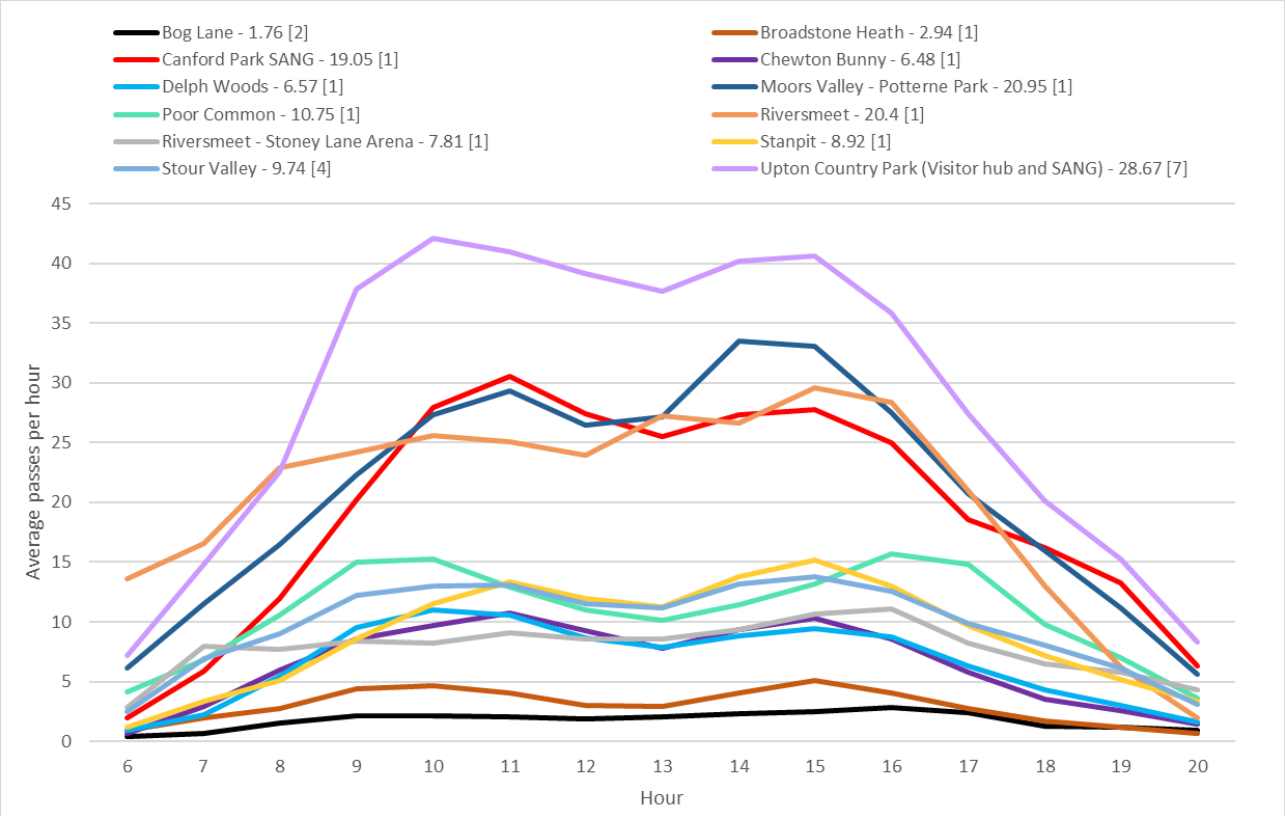


Figure 11: Hourly average number of passes for heathland sensors by SANG/HIP sites between 06:00 and 21:00. Data are compiled from all data, from an average of 2009 to 2015 (the period with most data) and 2018 to 2020 (to include recent trends and sensors). For each site name in the legend the average number of passes between 6:00 and 21:00 is given and the number of sensors used in brackets.

Visitor profile on HIPs/SANGs compared to the heaths

Visitor data from HIPs/SANGs sites shows variation between sites but indicates high levels of use by dog walkers at certain sites. At three SANGs the median route length of interviewees matches or is longer than that for the Heaths, demonstrating that SANGs can provide for a similar scale of visit.

Data from interviews with people on the heaths suggests around 7% of visitors also visit SANG sites (and note the survey took place prior to some HIPs/SANGs being operational). Interviews at SANG sites suggest a high proportion (nearly half at some sites) of interviewees would have visited a heath if the SANG/HIP had not been available.

Sensor data suggests the SANG/HIP sites have a similar profile of use through the day as heathland sites, with a bimodal peak and early morning use, reflecting in particular the use by local dog walkers.

Are there notable differences between HIPs/SANGs, with regards to capacity, effectiveness etc?

2.105 The different parts of the Dorset Heaths vary widely in their character and include some coastal sites, large expansive rural heaths with good views, smaller more urban sites etc. The range of access opportunities and types of recreational use of the heaths will vary and therefore, in order to provide a range of alternatives, HIPs/SANGs are likely to be most effective if they encompass a range of different sites and provide for a range of recreational use. The established HIPs/SANGs do indeed vary in character, and some examples are shown in Figure 12. Finally, SANGs also take a time bed in, iron out issues and become familiar as destinations, and as such use is likely to increase over time (which has been the case and is reflecting in the car park count data shown in Table 13).

2.106 Using the vehicle count data and the on-site visitor data it is possible to derive estimates of the number of people on each site, and we have converted these to give a figure for the number of people per ha per hour (Table 19). In order to derive these figures, we have assumed a visitor is typically on site for an hour and the average occupancy of a vehicle is 1.55 (taken using 8 of the more recent SANG surveys which have recorded this information). The people per ha per hour, albeit very approximate, is a useful metric to compare across SANGs and highlight those that might have some existing capacity (i.e. will feel less busy). While more accurate data are available for some sites, such as Riversmeet & Stanpit (Panter and Caals, 2020c) and Chewton (Panter and Liley, 2019), such a level of detail are not available for all sites at present and the information in Table 19 is therefore consistent across sites.

Table 19: Levels of access from the average vehicle counts in financial year 2019-20 and most recent tally count data (averaged for a single survey point) at each HIP/SANG (where data are available). An average of visitors per hour extrapolated from vehicles and the tally count is used to estimated visitor numbers of people per ha per hour.

Site name	Area (ha)	Average number of vehicles (2019/20 financial year)	Average people entering per hour (most recent tally count)	No. of visits per hour (averaged from the vehicle and tally estmates)	People per ha per hour
Bog Lane SANG	14.1	1	0.5 (2017)	2.1	0.15
Burnbake SANG	10.0	0.3	n/a	0.5	0.05
Bytheway Field SANG	14.7	9	15.5 (2017/18)	19.0	1.29
Canford Park SANG	52.1	10.6	11.8 (2019)	15.3	0.29
Delph Woods HIP	38.0	19.3	n/a	29.9	0.79
Frenches Farm SANG	4.8	2.4	1.4 (2018)	10.3	2.15
Granby Road HIP	1.5	24.3	n/a	37.7	25.11
Potterne Park HIP	11.1	71.2	n/a	162.3	14.62
Upton Country Park SANG	33.6	128.5	35.0 (2018 P1 &P2 surveys)	156.0	4.64
Iford HIP	26.2	n/a	4.9 (2019)	4.9	0.19
Riversmeet & Stanpit SANG	13.4	n/a	14.2 (2019)	14.2	1.06
South of Leigh Road East SANG	16.8	n/a	3.2 (2018)	3.2	0.19
Upton Woods HIP	5.2	n/a	5.3 (2018)	5.3	1.01
Woolslope SANG	11.6	n/a	6.0 (2013/14)	6.0	0.52
Total	**253.1**	**266.6**		**466.6**	**1.8**

Figure 12: Examples of SANGs (Main image: Bog Lane, insets, from left to right: Upton Country Park, Canford Park, BytheWay. Canford Park.

2.107 The busiest SANG according to these estimates is Upton Country Park, most other sites fall between 0.1 and 1.5, with the lowest figure for Burnbake. Sites above 1 person per ha per hour will be those that are well used and starting to feel busy. The two sites with the highest levels of visitors, at rough estimates of 15 or higher people per ha per hour, were both HIP sites – for which the metric is less relevant given these are often small. The estimate for Granby Road will be an overestimate as the site provides access to the Stour Valley Local Nature Reserve (a 35 ha site) and people will therefore spread out much further. However, the other HIP sites; Delph Woods, Upton Woods and Iford have ballpark figures between 0.1 and 1.

2.108 Route lengths (from interview data on SANG sites) are shown in Figure 13 in relation to the area of the site. Larger sites are likely to accommodate longer routes and this is to some extent confirmed by the plot. Based on the examples shown it would seem that at least 20ha and potentially more are necessary to accommodate a route of 2.27km, the median route length from the heath visitor surveys (Panter and Caals, 2020a)[21]. It can be seen that the South of Leigh Road East site is a slight anomaly in that it is under 20ha yet seems to accommodate route lengths of nearly 3km – the data from this site were prior to the SANG being established and most visitors were following existing public rights of way and existing Riverside Walk and therefore the use extending beyond the site boundary on existing green links.

2.109 Map 19 shows the data for individual sites and it can be seen that at the South of Leigh Road East site, much of the routes used are outside the site boundary, i.e. visitors are able to undertake longer routes by leaving the site. The map also highlights how some of the sites appear to have routes that maximise the use of space, despite apparent pinch points (e.g. Riversmeet & Stanpit and Frenches Farm). At Upton Country Park it appears that a wide range of different paths and route options are used by visitors, while both Frenches Farm and Riversmeet & Stanpit appear to have a single route close to the perimeter that is followed by most visitors. The south of Leigh Road east site appears to have an area that is under used (the east of the site), again due to the survey being undertaken prior to the SANG being established and fully operational. It is interesting to note that Bog Lane and Riversmeet & Stanpit are both similar in size yet visitors to the latter site undertaken longer routes, presumably a reflection of the site layout and design.

[21] For reference, it should be noted that to accommodate a route of 2.27km around the perimeter of a square it would need to have sides of 567.5m and therefore an area of 32.2ha.

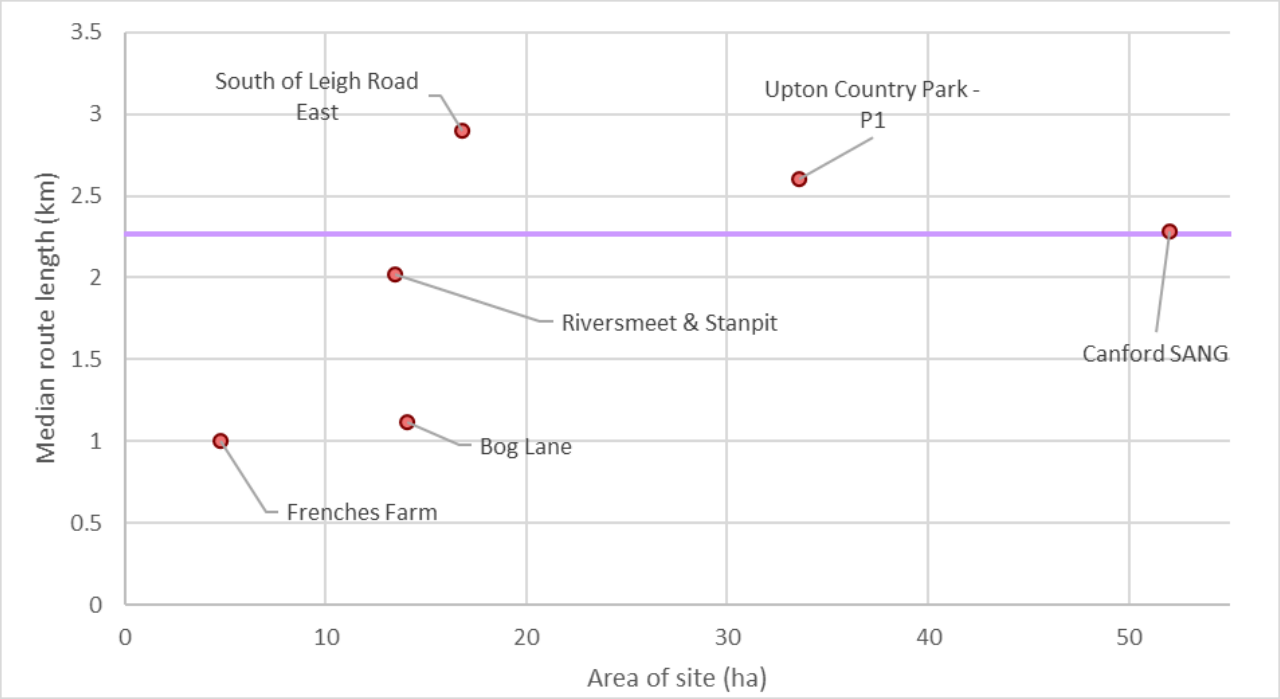


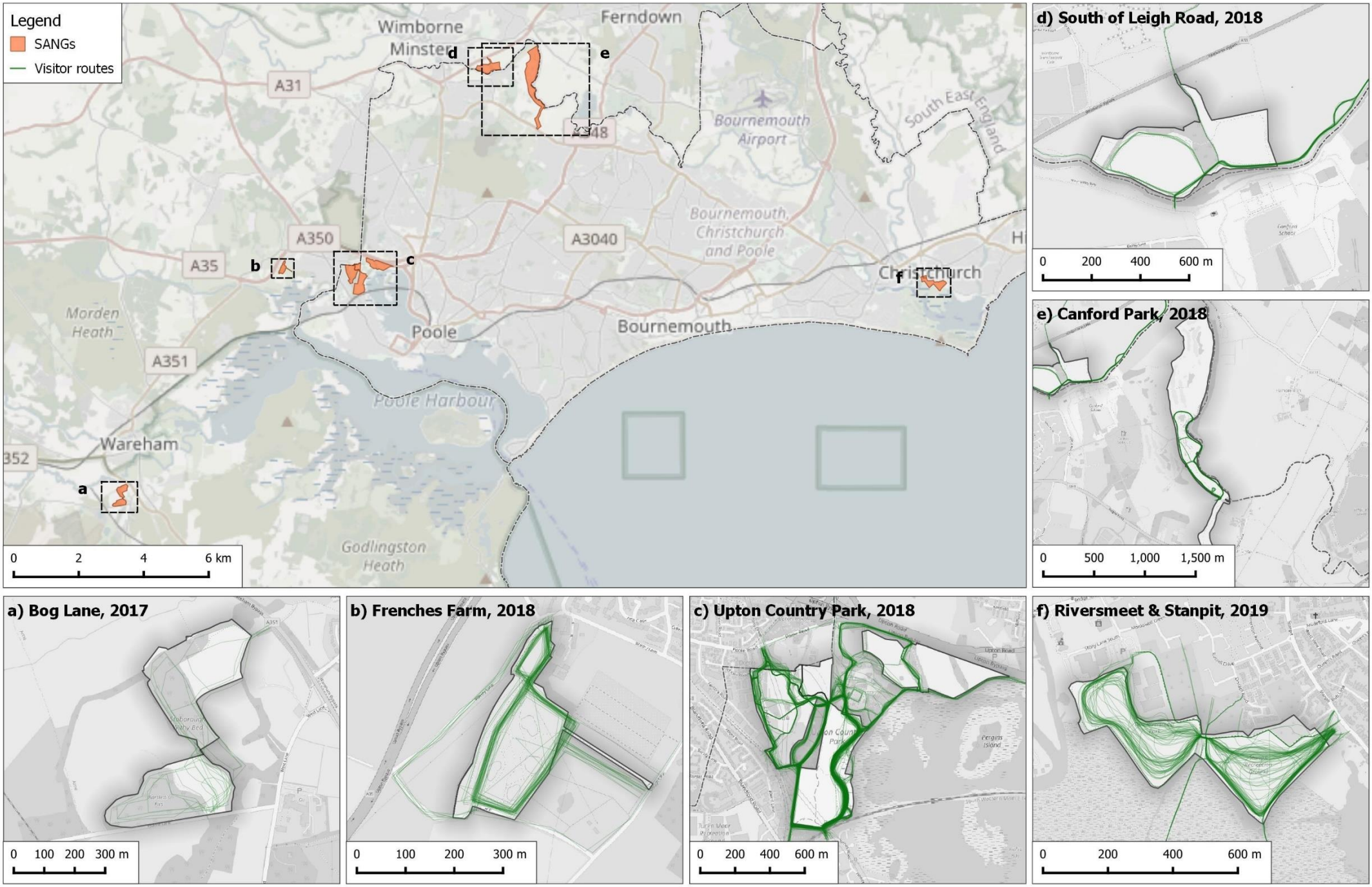
Figure 13: Scatterplot of median route length compared to size of the site. The purple line at 2.27km indicates the median route length recorded from the Dorset Heaths visitor survey. Note that for Canford SANG, when the visitor survey was undertaken only around 20ha of the site was operational.

2.110 Further indications on the variation between HIPs/SANGs comes from the interview data and the ratings given for each site. As part of the surveys, interviewees were asked to rate the sites on a score of 1 – 10. These scores are summarised in Table 20. It can be seen that all sites have good scores. Bog Lane has scored the lowest and there were a range of issues at the site which have subsequently been resolved.

Table 20: Site ratings for different HIPs/SANGs, where available from visitor surveys at individual sites.

HIP/SANG site	Mean site rating (10 = highest)	Reasons for score
South of Leigh Road East	9.4	Seems very well liked – little changes other than opening up access and new paths. Negatives; presence of livestock and no dedicated car park, can be wet and muddy in winter, stiles an accessibility issue.
Canford SANG	9.3	Seems well liked – large site with large car park, easily accessible. Negatives; it can be wet in winter and not clear opening hours.
Upton Country Park - P1	9.0 & 9.1	Main issue is with parking charges here and small size of the free dog walkers car park. Many reporting that littering and dog fouling have become worse.
Iford HIP	9.0	Antisocial behaviour and littering (local youths). Car park is poorly maintained. Flooding issues – muddy paths and bridge over the river would increase accessibility.
Upton Country Park - P2	8.6	People's issues are with parking charges and new path surfacing which is perhaps very new and so out of place ("*path stains dogs paws*" and "*should be less commercial*")
Frenches Farm	8.5	Most issues concerned with; 1) Drainage – lane can flood and become muddy 2) Car park is too small, as used by local residents not visiting the site, as limited parking within the development.
Bog Lane	7.7	Antisocial behaviour and litter issues. Poor gates. Paths can become wet and muddy, and no accessible path for less able in the field – boardwalks also slippery when wet. No signposts within site and signing on the road to the site.

Map 19: Routes from SANG visitor surveys



Variation between different HIPs/SANG sites

Levels of use of SANGs varies from around 0.05 people per ha per hour to 4.6 per ha per hour. Some sites are clearly well used and the range of SANGs/HIPs provide for a range of visitor experiences and encompass a range of different types of site. Site layout, design, shape and links to wider path network seem to influence the lengths of routes visitors undertake on SANGs. Route data suggest SANGs need to be well over 20ha to accommodate a 2.27km walk (this being the median route length for people visiting heaths) or at least connected to a wider path network/routes outside the site.

How have heath visitor numbers changed?

2.112 In 2007 we estimated around 15,000 people visited the Dorset Heaths per day in August, approximately split such that 4,688 people per day were estimated to walk to the heaths and 10,312 arrived by car (Liley et al., 2007). These estimates were based on models that were built using data from a relatively small proportion of access points.

2.113 More recent data on visitor numbers to the heaths comes from the vehicle counts and the automated sensors on the heaths. The vehicle counts provide a snapshot of visitor use across all the heaths, but are focussed just on those arriving by car. As housing growth has not taken place within 400m, any increase in access linked to development is most likely to be apparent from that data. The sensor data provide very detailed data from a very specific location.

Vehicle counts

2.114 The vehicle counts conducted by the UHP across the Dorset Heaths (and including the SANG/HIPs etc) since 2010 provide a valuable resource to examine changes in the number of vehicles present as a proxy for visitor numbers .

2.115 Data from all the counts are shown in Figure 14. The marked variation in counts on different dates reflects the difference between different times of the year, types of day (e.g. weekends, weekdays, bank holidays) and the weather on the day the count was undertaken. Counts ranged from 2,582 (the August bank holiday in 2017) to 118 (a rainy summer weekday in 2016). This range suggests a 22x variation in the number of vehicles present, reflecting the inclusion of the coastal car parks at Hengistbury and Studland that can be very busy in certain weather conditions and times of year. Some variation will also relate to the car parks counted in each count, as inevitably there is some slight variation over time, with new parking locations

added and some dropped or skipped on particular dates. It should be noted too that the data reflect the period before the pandemic and that during and following Covid fluctuations may well be even more marked.

2.116 Data from the most recent Dorset Heaths visitor survey indicates a mean group size for those arriving by car of 1.6 people. This would suggest visitor numbers (arriving by car) across all the count locations at peak times could be around 4131 people. The most recent capacity estimates suggest 3,391 spaces across all these parking locations. The peak count of 2,582 is therefore around 76% of all spaces occupied.

2.117 Count data from all counts are summarised in Figure 14. To help account for some of the variation between different sites, parking locations were categorised into core 'Heath' sites (where there is access only to a heath and no other facilities) and also 'Heath+ or Heath VS' sites, where there is also access to the beach or Harbour (e.g. some of the parking locations at Studland or Ham Common) or where there are visitor centres and facilities (such as Arne, Avon Heath Country Park and Hengistbury Head). These two types of heath are plotted as dark purple and paler purple respectively and it can be seen that these 'Heath+ or Heath VS' sites are the locations where the marked peaks in access occur.

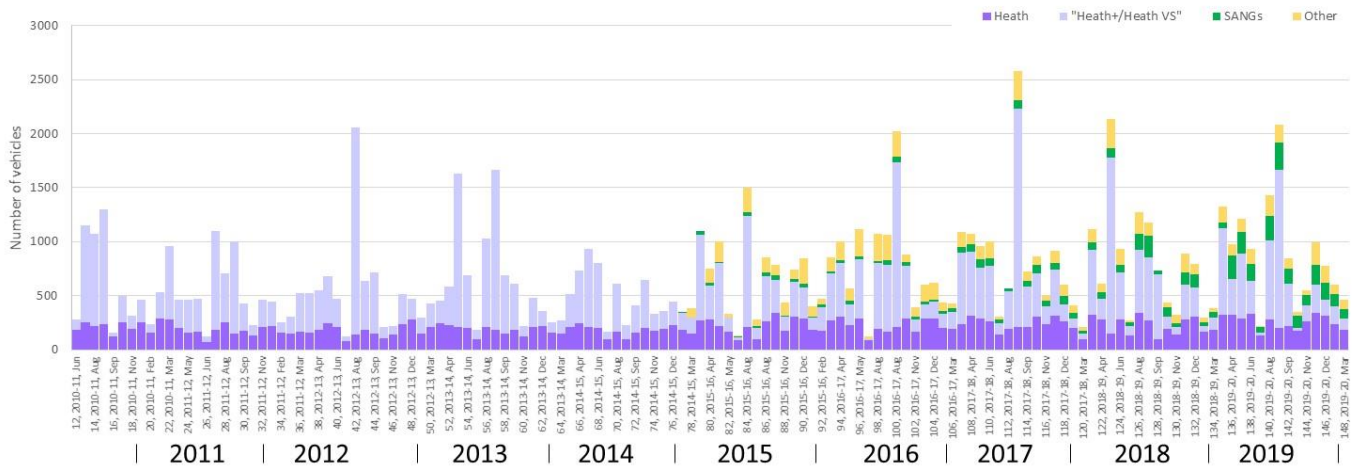


Figure 14: Vehicle count data from 2010-2020. Data from all parking locations.

2.118 Taking all Heath sites only (i.e. both the shades of purple in Figure 14), counts ranged from 92 vehicles to 2,230, with a mean (± 1SE) of 597.9 (±33.6). Using our typical car occupancy figure of 1.6 people, these data suggest on average there are around 956.7 people visiting the Dorset Heaths at any one time (that have arrived by car) and at peak times this could be as many as 3568. The respective means (± 1SE) for the 'core' heath visitors (dark purple in Figure 14) and heath +/heath VS sites (pale purple in Figure 14) were 253.2 (±18.7) and 362.2 (±108.5).

2.119 Mean vehicle counts are shown for the heaths only by year in Figure 15. The plot shows the mean for all types of heathland parking locations (i.e. 'Heath' and 'Heath +/Heath VS'). The large error bars reflect the variation within the year (i.e. between counts on holiday days and non-holidays and different times of the year). Overall there is an indication of a general increase over the period shown.

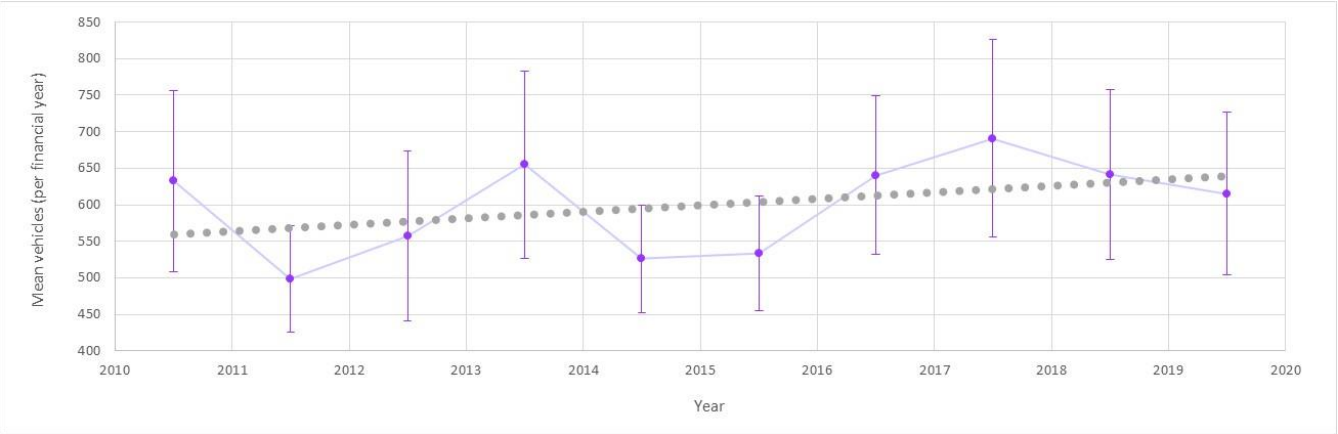


Figure 15: Mean vehicle counts (per financial year) ±1 SE for all heath parking locations (i.e. 'Heath' and 'Heath +/Heath VS). Dotted line is a linear trend line.

2.120 The same data are shown in Figure 16, here split between the different types of parking location. It can be seen that the means for the heath + and heath visitor centre sites are higher and show much variation, such that any trend or pattern over time is hard to differentiate over the time span shown. For the core heath sites however there is less variation. The mean for 2010-11 (222.0 vehicles) is similar to the means for 2015-16 (218.4 vehicles), 2016-7 (223.6 vehicles) and 2018-19 (223.4 vehicles), however most years are higher than the previous years and the data suggest an increase over time. The mean count for 2010-2013 was 187.7 and this compares to an average for the period 2017-2020 of 238.3, giving a ratio of 1.269, indicating a 27% increase in vehicles (pooled data across all core heath sites).

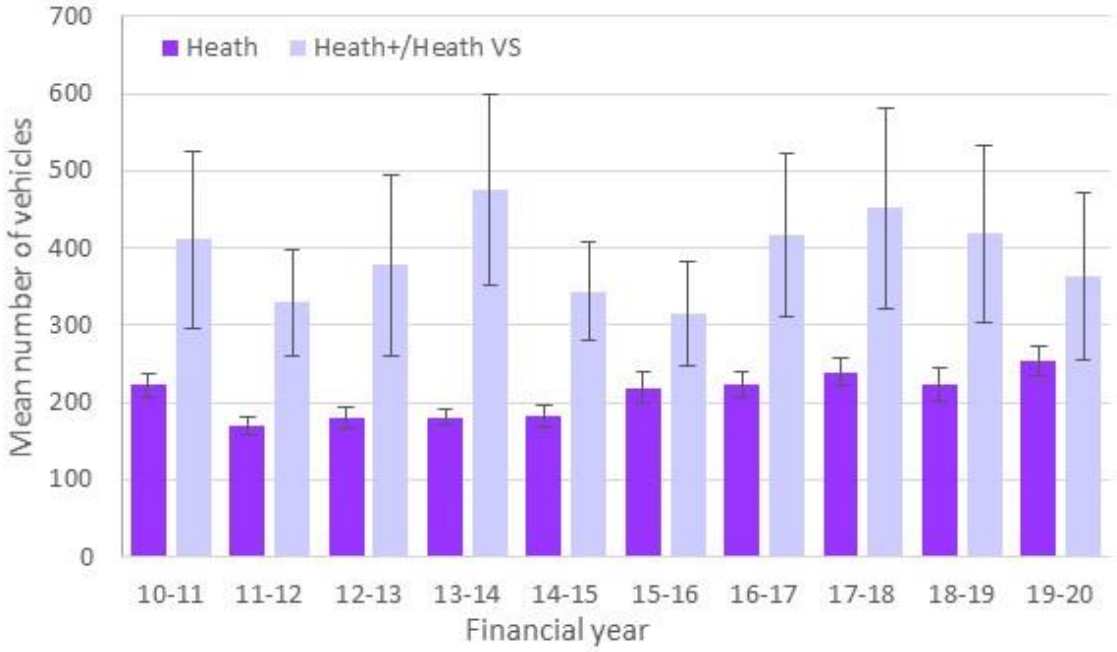


Figure 16: Mean (+1 SE) values by year for 'core' heath car parking locations and for heath+/heath VS locations.

2.121 Data are shown for particular times of year in Figure 17, which uses data from a single count in each year and shows comparable data across years in terms of the total number of vehicles. All heath parking locations are included (i.e. including Heath+ and Heath VS locations). These plots allow a clearer indication of the overall trend since 2010, and linear trendlines are fitted to show the general direction in each plot. It can be seen that the data suggest an overall decline in visitors to the heaths during the spring weekdays and for the summer school holidays while most plots appear to be relatively flat or a slight increase. The plots for the spring holidays, spring weekends and bank holidays show a general increase in visitor numbers, but there are no significant correlations for any of the plots (Pearson correlation coefficient >0.05 in all cases). The various peaks reflect the effect of the weather (i.e. counts being undertaken on particularly sunny days) and are particularly apparent on the bank holiday plots where good weather is perhaps more likely to have an effect on visitor numbers.

Figure 17: Vehicle count data for different dates/times of year for heath sites only. Plots reflect different count dates (i.e. 1 count per year), with 2 separate dates shown on the autumn term weekday plot. Trend lines are linear. Note different y axis scale on right hand 4 plots.

2.122 The ratios for different individual heaths, comparing the years 2010-2013 with the period 2017-20 are shown in Figure 18, and only 'core' heath access points are included (i.e. those without other attractions). The data relate to financial years starting with 2010-11 and ending with 2019-20. Where the ratio is less than 1 it indicates that the mean for the period 2017-20 is lower than 2010-13 and therefore indicates that visit use (by car) has gone down. Values above 1 indicate an increase, i.e. more vehicles across the site on average from the recent counts. It can be seen that data are available for 24 sites, with 8 sites showing a decrease and 16 an increase. The values at the end of the bars reflect the numerical difference between the two sets of data.

2.123 The plot suggests a marked decrease in the number of vehicles at a few sites, notably Turbary and Kinson Common, Corfe & Barrow Hills, Slop Bog & Uddens Heath, Parley Common, Bourne Valley and Winfrith Heath. The highest increase was at Ham Common, where the mean vehicle count for 2017-20 was more than twice that of 2010-13.

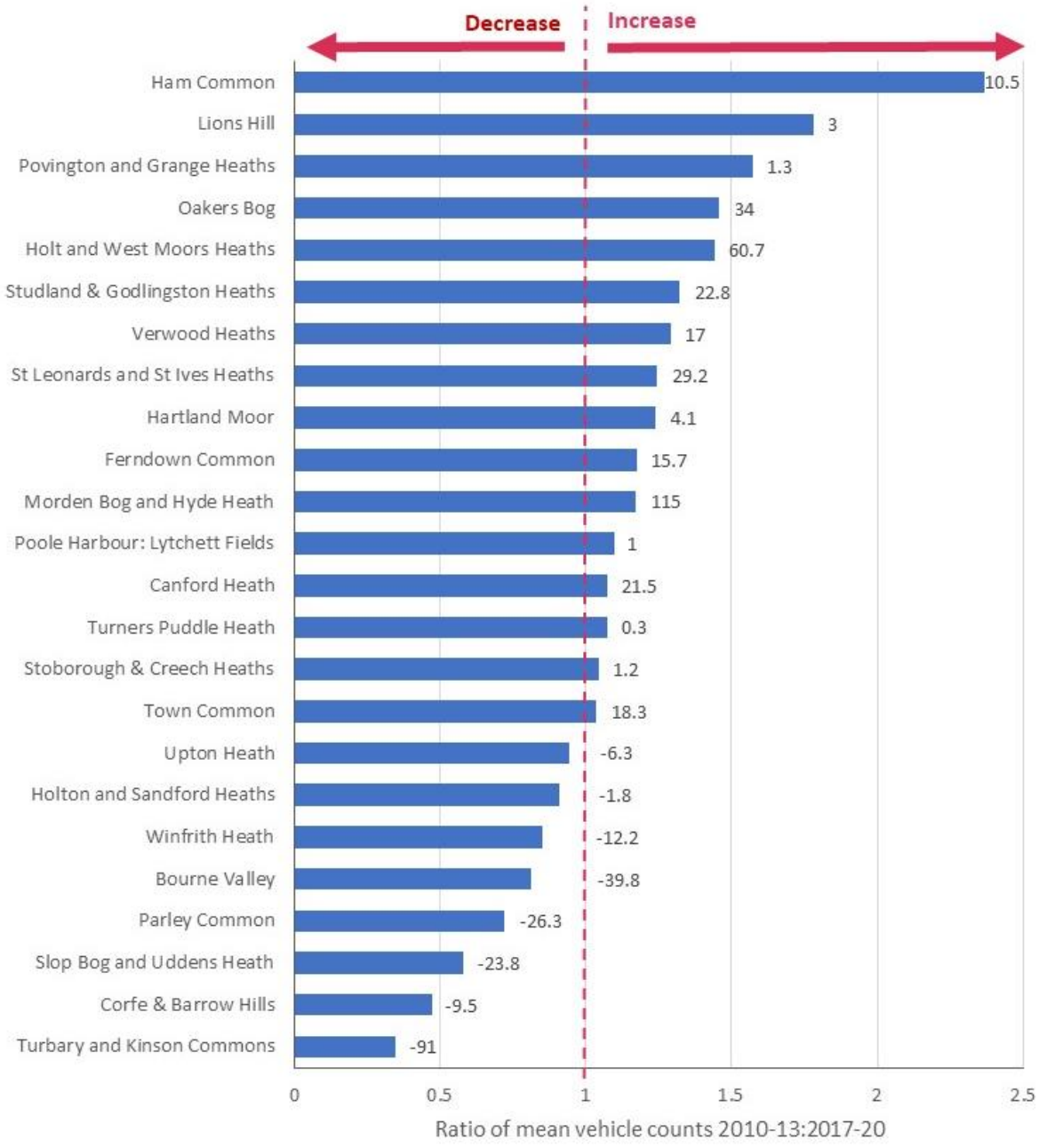


Figure 18: Ratio of vehicles counted by UHP during period 2010-2013 compared with 2019-20. Only those car parking locations solely providing access to heaths included. Labels at end of bars give the difference in the mean number of vehicles between the two periods.

Sensor database

2.124 The sensors provide an extremely large, powerful dataset. However, it is important to remember sensors cover a selection of very specific access points and therefore represent very discrete locations rather than providing data at a site or heath scale (even when there is more than one sensor at a given site). The sensor data are useful to answer specific points regarding differences between hourly and daily

patterns and long-term changes over time (at very specific points) but do not provide as comprehensive an overview as the vehicle count data.

2.125 Table 21 summarises the number of sensors at SSSIs and the sensor data by site. Overall, the sensors with the most passes were those at Ham Common and Christchurch Harbour (i.e. Hengistbury Head).

Table 21: Summary of the average number of passes per day for heaths. Data are the annual average across all years of available data. Sensors are categorised according to the type of access point at which they are deployed. Average values are given in the columns for specific types of sensors, which can include multiple types on a single site.

Site	Number of sensor	Heathland	Heathland& Other	Heathland& Other/ Visitor attractions	HIP& Other	Visitor attractions
Ham Common	4	25.4	3.7			
Upton Heath	4	4.8				
Town Common	4	4.7				
Turbary and Kinson Commons	11	4.4				
Bourne Valley	9	4.0	12.7		1.7	
St Leonards and St Ives Heaths	13	3.0		10.2		8.4
Canford Heath	12	2.9				
Poole Harbour: Lytchett Fields	2	2.9				
Slop Bog and Uddens Heath	3	2.1				
Morden Bog and Hyde Heath	2	2.0				
Lions Hill	1	1.7				
Ferndown Common	6	1.6				
Winfrith Heath	3	1.5				
Stoborough & Creech Heaths	6	1.3			1.8	
Parley Common	7	1.2				
Corfe & Barrow Hills	1	0.2				
Christchurch Harbour	3			25.8		

2.126 The sensor data have many gaps where sensors have failed, been moved etc. The use of a short time window (weeks 20 to 30 of the calendar year), and an average for the 3 years 2007, 2008 and 2009 compared to the last 3 complete years 2017, 2018, 2019 limited some of these issues (see methodology for more details) and allows a comparison of how visitor numbers have changed at different locations. Table 22 gives a summary of the sensor data for the SSSI sites, many of which have multiple sensors.

2.127 The ratios in Table 22 give the change between the start period and end period, with values above one indicating an increase and below one a decrease in footfall. As with the vehicle count data, the sensors indicate an increase in footfall at Morden Bog & Hyde Heath and Town Common while both data also show a decrease in footfall at Parley Common and at Turbary & Kinson Commons. Contrary to the vehicle count data however, the sensors at Lions Hill, Ham Common, Canford Heath, St Leonards & St Ives Heaths and Ferndown Common all show a decrease (vehicle counts at these sites have increased) while sensor data from Upton Heath, Bourne Valley and Slop Bog & Uddens indicates an increase in use (vehicle counts at these sites have decreased). These discrepancies will be down to the sensors capturing footfall from people on foot and arriving by car, but only at very discrete points in space.

2.128 The average ratio for the 12 sites in Table 22 (i.e. average of the final column) is 1.01, suggesting that there has on average been no change in the numbers of visitors based on the sensor data.

Table 22: Summary of sensor data from sensors between weeks 20 to 30 of the calendar year in 2008/09/10 (start) and 2017/18/19 (end) grouped by SSSI[22]. Only sensors with useable data at the start and end periods were used. Values presented are the average number of passes per hour between weeks. Only weeks of complete data were used (to account for a weekday/weekend balance). Grey shading indicates ratios above 1, indicating sites where the average from the end period is greater than that from the start

SSSI	Number useable sensors	Start period (2008-10)		End period (2017-19)		Ratio between start and end
		Complete weeks used	Average passes per day	Complete weeks used	Average passes per day	
Bourne Valley	4	70	3.65	99	4.33	1.19
Canford Heath	4	52	5.94	79	4.47	0.75
Ferndown Common	2	66	0.88	33	0.81	0.92
Ham Common	4	56	7.63	101	5.22	0.69
Lions Hill	1	23	2.09	32	1.10	0.53
Morden Bog and Hyde Heath	2	56	2.19	31	2.64	1.21
Parley Common	2	66	0.70	44	0.32	0.45
Slop Bog and Uddens Heath	1	22	2.74	18	4.28	1.56
St Leonards and St Ives Heaths	2	42	4.66	57	4.13	0.89
Town Common	2	61	3.64	56	6.74	1.85
Turbary and Kinson Commons	1	22	5.42	33	5.02	0.93
Upton Heath	4	88	4.90	103	5.64	1.15

[22] The start / end period should have provided a total of 33 weeks per sensor, although as can be see this was often not met due to incomplete data.

2.129 In order to compare change across different types of site, we used data on the average number of daily passes each year in weeks 8-12 for all sensors, including those at SANG/HIPs, and the change over time at these sensors. This accounts for the variability in sensors' start and end dates, which often did not extend the full length of the study window. Table 23 gives the correlation coefficient for the number of people past each sensor against year for each sensor, averaged for different types of sensor. This requires more than two years of data and means it is possible to include sensors where there is a year or years of missing data between the first and last year values. The table also gives the ratio between the first and last year of data available for each sensor. These ratios are derived where sites have two or more years of data, allowing us to use more data points. These ratios are also shown by type of site in Table 23 and visually in Figure 19.

2.130 Both approaches indicate that the SANG and visitor attraction site types have shown large increases, higher than those of the heaths but with much variation and overlap between the different types of sites (as reflected by the error bars in Figure 19. The analyses are crude and in particular the correlation coefficients are based on a small number of sites (in particular both SANG sensors are at Upton Country Park Phase 1, so relate to a single site) and the visitor attraction sites are based on only two sites: Avon Heath Country Park and Upton Country Park (the non-SANG areas).

Table 23: Results of analysis on annual average number of passes per day for each sensor, grouped by site type. The total number of sensors is given, followed by the number of sensors with two or more years of data which could be analysed. Blue/red text lower/higher 2 values in each column.

Site type	n (>2 years)	Average correlation coefficient of all sensors against year	n (=>2 years)	Average difference between years (passes per hour)	Average ratio between variable first year value and last year value
Heathland	51	-0.03	66	1.96	1.31
Heathland & Other	2	-0.06	2	0.35	**0.88**
Heathland & Other/ Visitor attractions	6	-0.04	6	0.86	1.13
HIP	8	-0.08	17	0.55	1.12
HIP & Other	2	**-0.19**	3	-0.03	**0.87**
HIP (& heathland)	6	-0.16	6	**-0.04**	1.11
Other	8	**-0.26**	17	**-0.19**	**0.88**
SANG	2	**0.70**	13	**3.27**	**1.46**
Visitor attractions	4	**0.12**	6	**6.02**	**2.26**

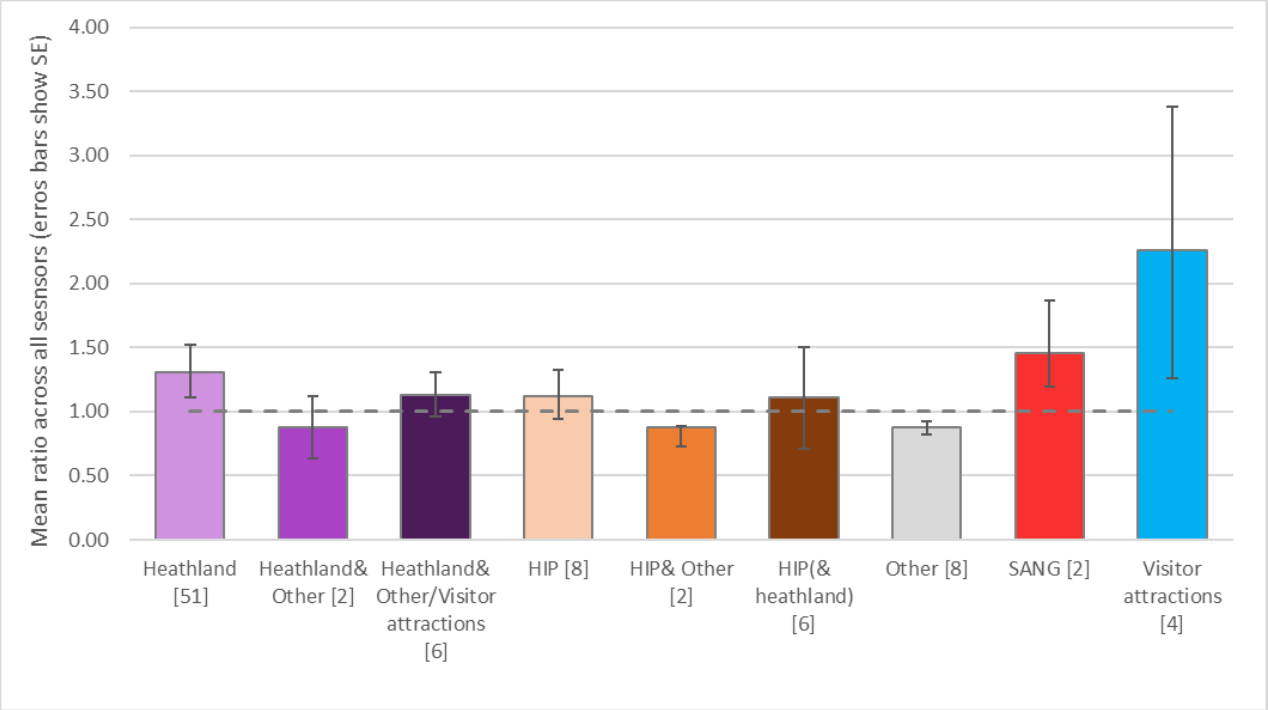


Figure 19: Ratio of change from first year value to last year value (variable for each sensor) averaged

Changes in visitor numbers to heaths

Data on visitor numbers comes from counts of parked vehicles (regular transects covering most heath parking locations) and from automated visitor counters ('sensors'). The vehicle counts provide a surrogate measure and clearly do not capture data on those who arrive on foot. The sensor data are very discrete in space and time and few sensors provide comparable data for the whole period of interest. The number of vehicles on individual heaths has increased on average by around 10-13% (2010-13 compared to 2017-20). Over the same period, the total number of vehicles across the heaths as a whole has increased by around 27% (based on vehicle counts for core heath locations only, i.e. excluding those with locations with visitor centres or access to coast, harbour etc). The increases particularly relate to the spring school holiday, spring weekends and spring and summer bank holidays. There is considerable variation between different heaths, for example overall the number of cars has decreased at 8 sites and increased at 16. There are 12 heaths where sensor data allows meaningful comparison for the period 2008-2010 with 2017-19. These data suggest visitor numbers have increased at 5 sites and decreased at 7 and on average there is no meaningful change over time. Sensor data from SANGs and non-heath locations show a stronger comparative increase in visitor use.

Where are heath visitors coming from and what gaps in distribution of visitors are indicated from interviewee postcode data?

2.131 The most up to date information on the origins of heathland visitors is from the 2019 Dorset Heaths visitor survey (Panter and Caals, 2020a). The individual postcodes of interviewees are shown in Map 20. Map 20 also shows housing density. It is important to recognise in these data that the postcodes shown reflect the origins of visitors to the survey locations included in the visitor survey – which is a relatively small sample of the heath access points as a whole.

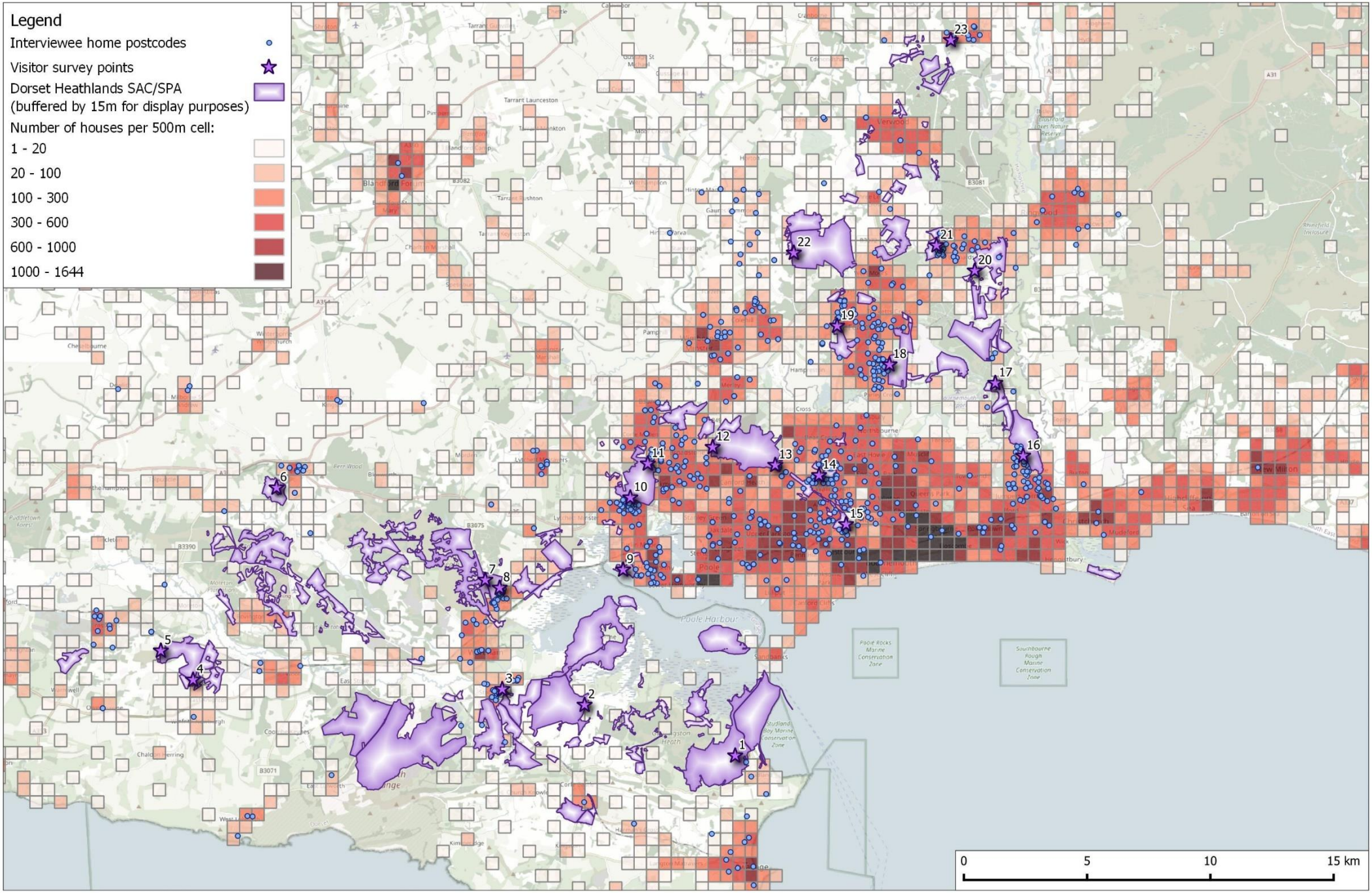
2.132 The postcode data are shown as visit rates in Map 21, with the visit rate calculated as the number of interviewees relative to the pool of people living in the same area. We have used a 2km hexagonal grid with the shading indicating visit rate (i.e. darker cells indicating more visits per house). The size of the hexagons reflects the number of residential properties in each 2km cell.

2.133 High visit rates (typically around 3-5% of households being interviewed) were recorded in cells which included the heath sites, more so in the rural areas i.e Wareham, Sandford, Hurn, Alderholt, where there is lower housing. There were also some relatively high visit rates in some urban areas (e.g. 2.6% of households around West Parley, 1.3% at Upton, 1.1% West Howe). Further away from the heaths high visit rates (i.e around 1-3%) are reflected in some rural areas Bere Regis/Milborne St Andrew/Winterborne Kingston, and north of Wimborne i.e Holt, Stanbridge, Witchampton. The map suggests that some of the urban areas further away from the heaths (and perhaps close to the coast (e.g. Bear Cross, Moordown, Ringwood, central Poole), and particularly in the coastal edge of BCP have low visit rates.

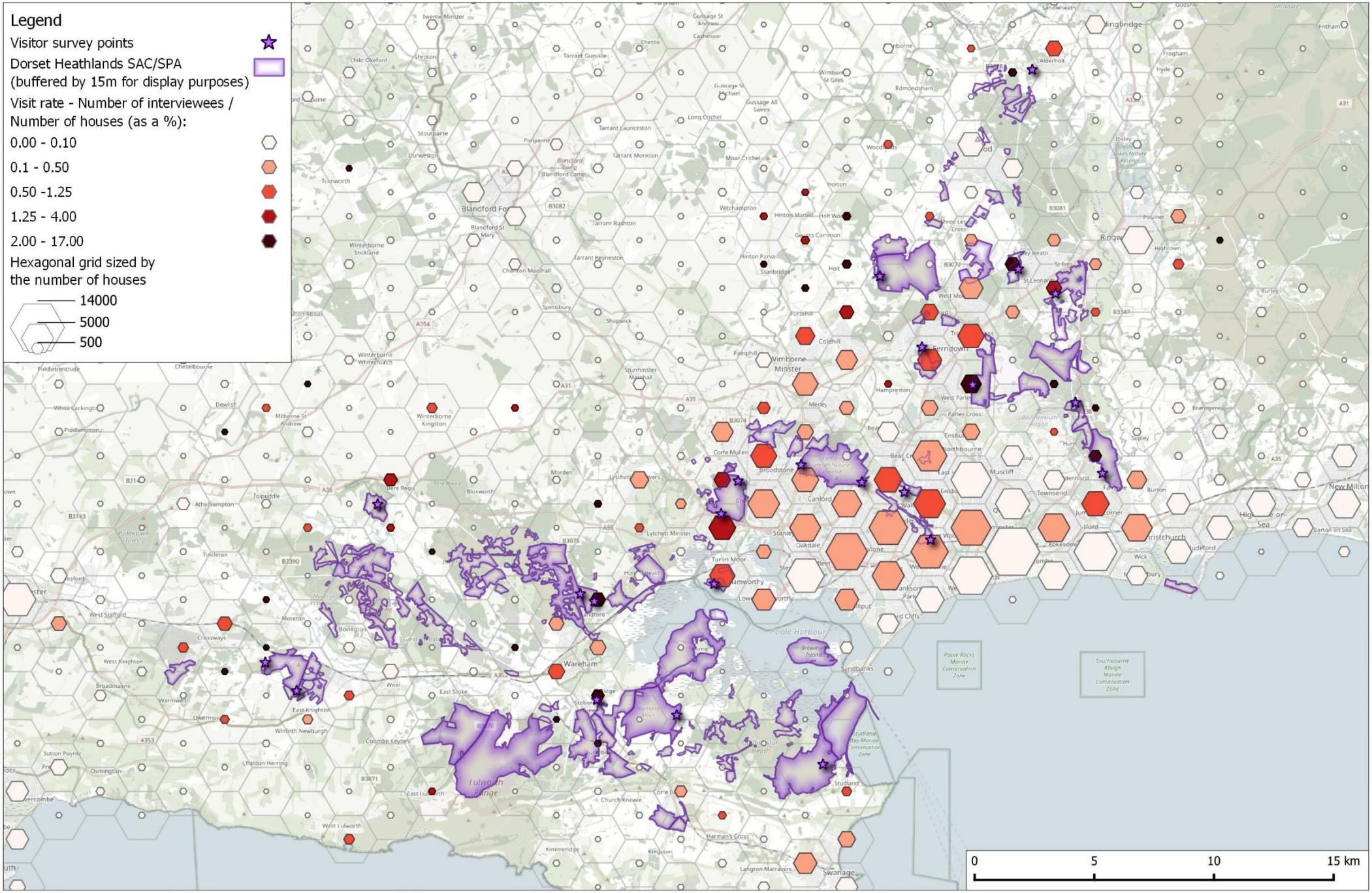
Where heath visitors originate from

Postcodes for heath visitors were collected as part of the 2019 visitor survey at a selection of survey points across the heaths. The postcode data for these locations show heath visitors originating from residential areas across Dorset and BCP, particularly those in relatively close proximity to the heaths. When taking into account the density of housing, the data suggest relatively low visit rates from the central area of BCP and the areas of BCP that are close to the coast.

Map 20: Dorset Heaths interviewee postcodes from the 2019 visitor survey, overlaid on housing density.



Map 21: Visit rate described using a 2km hexagonal grid. Size of hexagon reflects number of houses within the cell, darker red reflects greater visit rate.



How does the distribution of change in heath visitor numbers relate to housing change and SANG proximity?

2.135 Individual heaths will differ in their ability to attract visitors, whether by car or on foot. Figure 20 shows visit rate for individual SSSIs, calculated as vehicles per weighted housing (left) or the number of sensor passes per weighted housing (right). These rates are plotted to allow comparison between the first (x axis) and last (y axis) three years of the data. The dotted lines show the 1:1 ratio, such that sites above the line have increased over time and sites below the line have decreased. The symbols reflect the size of the heath, allowing visual checks as to whether there are differences between small and large sites.

2.136 Relative to this variation in visitor rate between SSSIs, the within site change in estimates of visitor rate between the first three years and the last three years studied is generally small, especially when based on vehicle counts. The most noticeable exception being Oakers Bog where although the nearby housing had hardly changed, the average vehicles per year increased by 46% (from 74 to 108) (Figure 20 left). When visitor rate is measured by the on-site sensor counts, the most obvious changes were (a) visitor rate increase at Town Common due to an estimated 85% increase in sensor rate over the period local housing increased by only 10% and (b) visitor rate decrease at Lions Hill where the estimate sensor count almost halved despite an 8% increase in local housing (Figure 20 right).

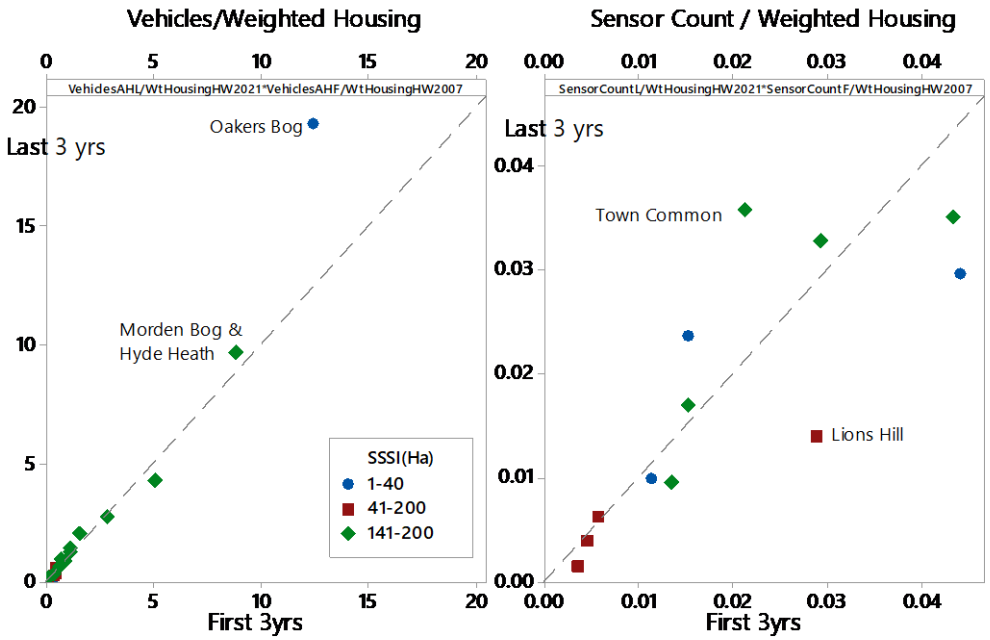


Figure 20 Variation between SSSIs in visitor rates in last three years (y-axis) and first three years (x-axis) as measured by vehicles count (left) and visitor sensor counts (right) per weighted housing density around the SSSI

2.137 There was no significant correlation between the ratio in the weighted housing variable (2007:2021) and the change in the ratio of vehicles from the vehicle counts (all vehicle count locations, average 2010-2013:2017-2020) (Rank Spearman correlation coefficient = -0.01, N=25 heaths, p>0.05). There was also no significant correlation if data from heath only access points were used (i.e. excluding destination car parks with major facilities and visitor centres such as Arne, Hengistbury or Avon Heath Country Park) (Rank Spearman correlation coefficient = -0.20, N=24 heaths, p>0.05). This indicates there is no correlation between housing growth and visitor numbers, i.e. those sites where visitor numbers have increased are not necessarily those with a greater level of housing change in their vicinity.

2.138 Another way to assess the general pattern of changes in visitor rate relative to changes in local housing density, which eliminates differences between sites in the relative attractiveness, is to calculate the ratio V of increase in visitors (last 3 years divided by first 3 years) and the ratio H of increase in weighted housing (last 3 years divided by first 3 years) and calculate Q = V/H. If Q is 1 then visitor numbers have increased in proportion to any increase in local housing. If Q is less than 1, then visitor numbers have either increased less than expected from any increase in housing or may even have fallen. There are several possible explanations for this, the new housing may be occupied by people with relatively less free time or inclination to use the heaths, but it could also hint that the overall management of heaths and SANGS has deflected some existing or new users away.

2.139 The frequency distributions of Q values across the SSSIs for which visitor data were available are shown in Figure 21. At the 25 SSSIs where changes in vehicle counts were available, 11 SSSIs had Q<1 (i.e. proportional increase in vehicles was less than the proportional increase in nearby housing) and 14 had Q>1. A statistical sign test indicated this was not significantly more or less than half the SSSIs (p=0.69). When restricted to vehicle counts on heath sites (core heaths only), 9 of the 24 SSSIs had Q<1 (test p=0.31). Only 12 SSSIs had appropriate sensor count data, of which 7 had Q<1 (test p=0.77). More sensitive Wlicoxon signed rank tests on log Q values also gave non-significant values (all p >0.45) for all three measures.

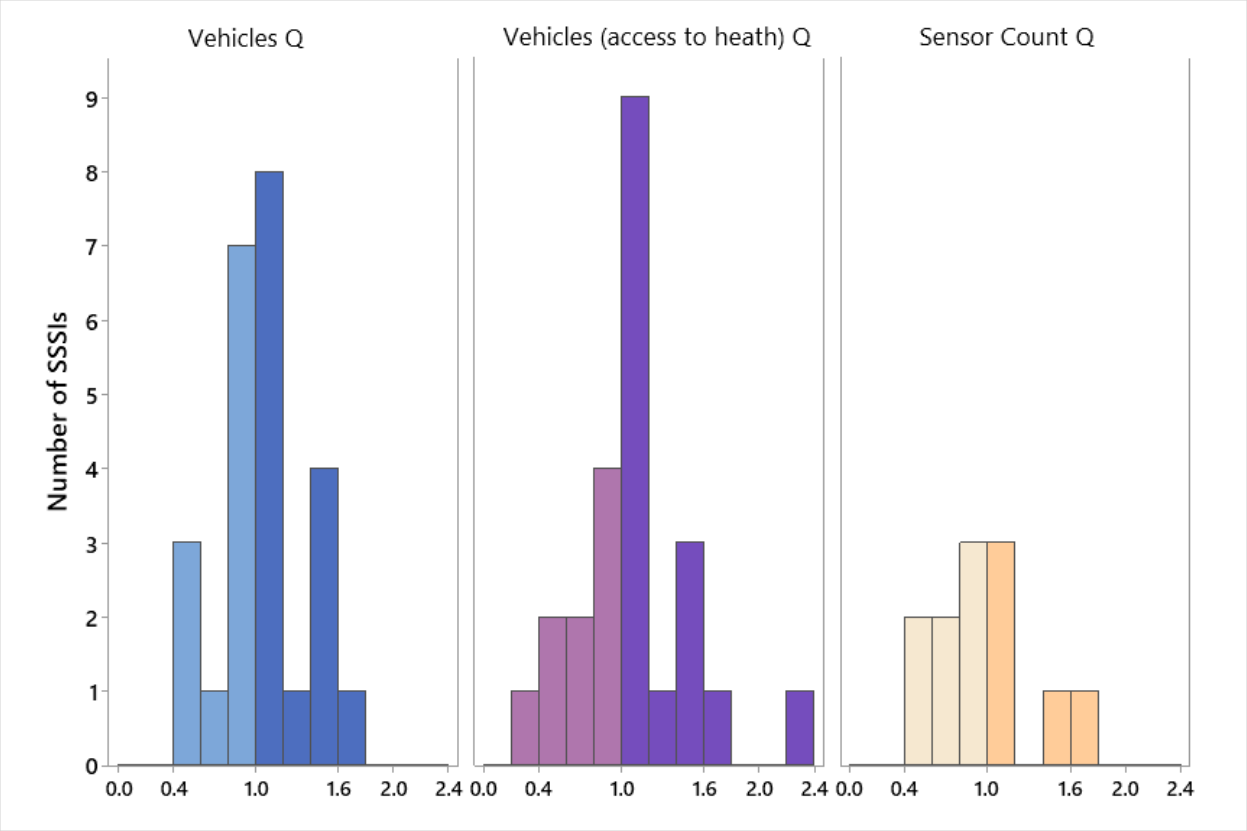


Figure 21 Frequency distribution of Q, the proportional increase in visitors relative to the proportional increase in weighted nearby housing at each SSSI, where visitor levels are estimated by vehicle counts, vehicle counts with access to heath, and site-access sensor counts. Paler shading (Q<1) indicates visitor numbers have either increased less than expected from any increase in housing or may even have fallen.

2.140 In conclusion, across the SSSIs as a whole, visitor rates have increased in proportion with the increases in nearby housing, but there is considerable variability between sites (Figure 21) and the more urban sites have not seen a greater increase in visitor use. This merits further investigation, especially in relation to the range of management measures undertaken and the introduction of SANG.

Distribution and influence of SANGS (on visitor use of heaths)

2.141 There is, as perhaps expected, a high correlation (correlation r = 0.96) between the total number of SANGs/large HIPs and the total area of SANGS/large HIPs within 5km of a SSSI (Figure 22). However, perhaps surprisingly, there is no correlation between the SSSI area and either the total number of SANGS/large HIPs (r = 0.09, p=0.58) or the total area of SANGS/large HIPs (r = 0.06, p=0.72), as shown by the lack of pattern with SSSI area in Figure 22. This means that although larger SSSIs would naturally have a greater total surrounding area within 5km, there is no tendency for larger SSSIs to have a greater total area or number of SANGS/large HIPs within 5km. This means it is valid to simply assess whether the tendency for visitor rate changes

to be greater or less than housing changes (as measured by Q described above) is related to the amount of nearby SANGS/large HIPs

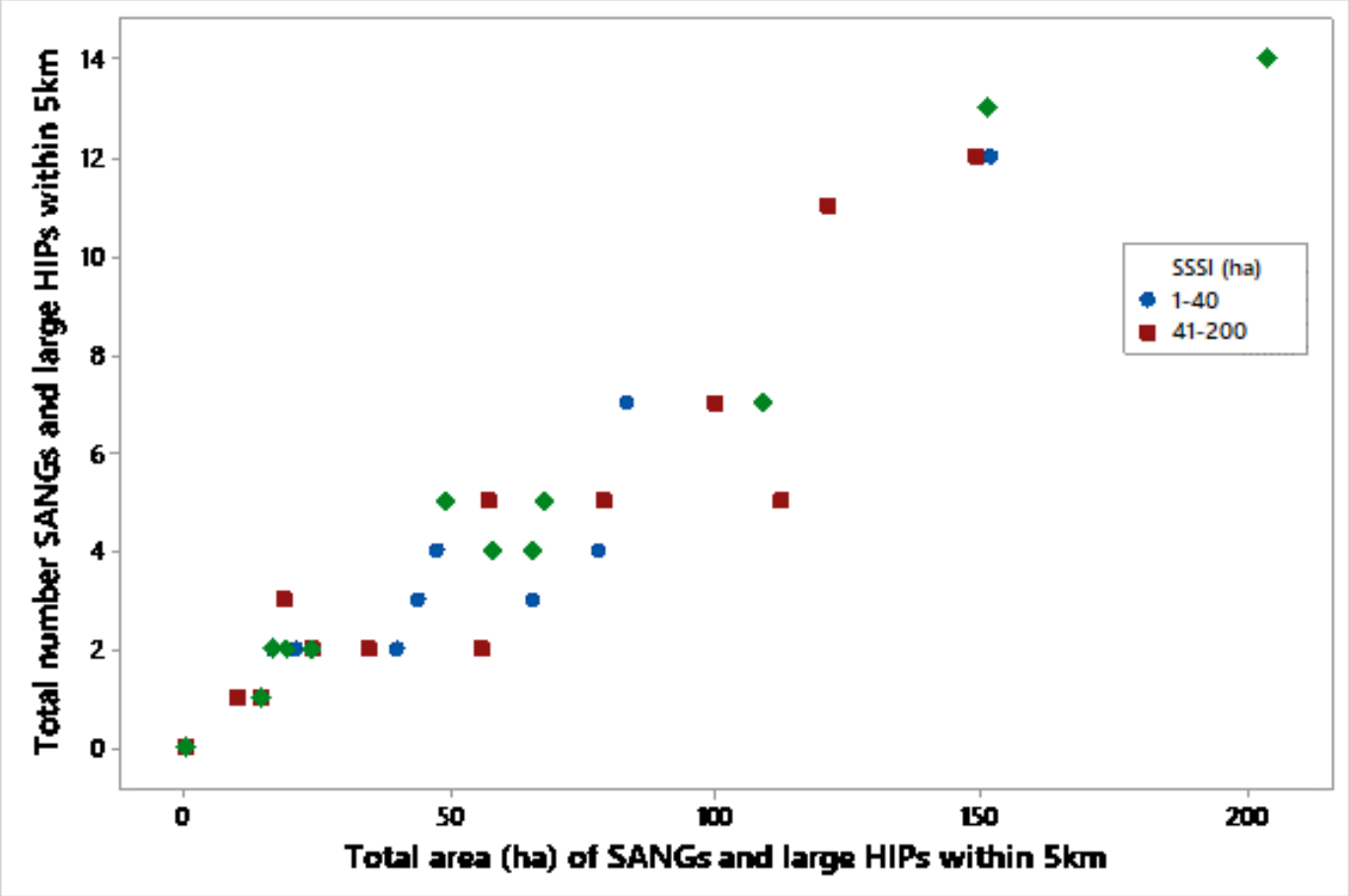


Figure 22 Relationship between Total number of SANGS within 5km and area (ha) of SANGS within 5km; with the 43 SSSIs grouped by SSSI area (ha)

2.142 The relationship between each of the three Q measure of visitor increase relative to housing increases and either the total combined area or number of SANGS/large HIPs within 5km of the SSSI is shown in Figure 23. All of the six correlations are negative although none were statistically significant; the strongest correlation was between Q for vehicles counts in places adjacent to heath and the total number of SANGS /large HIPs within 5km ($r_=$ -0.29, p =0.18) (Figure 23).

2.143 The correlations between the weighted combined areas of SANGs/large HIPs and each of the 3 Q measures of visitor increase relative to housing increase were also not statistically significant (all p>0.53).

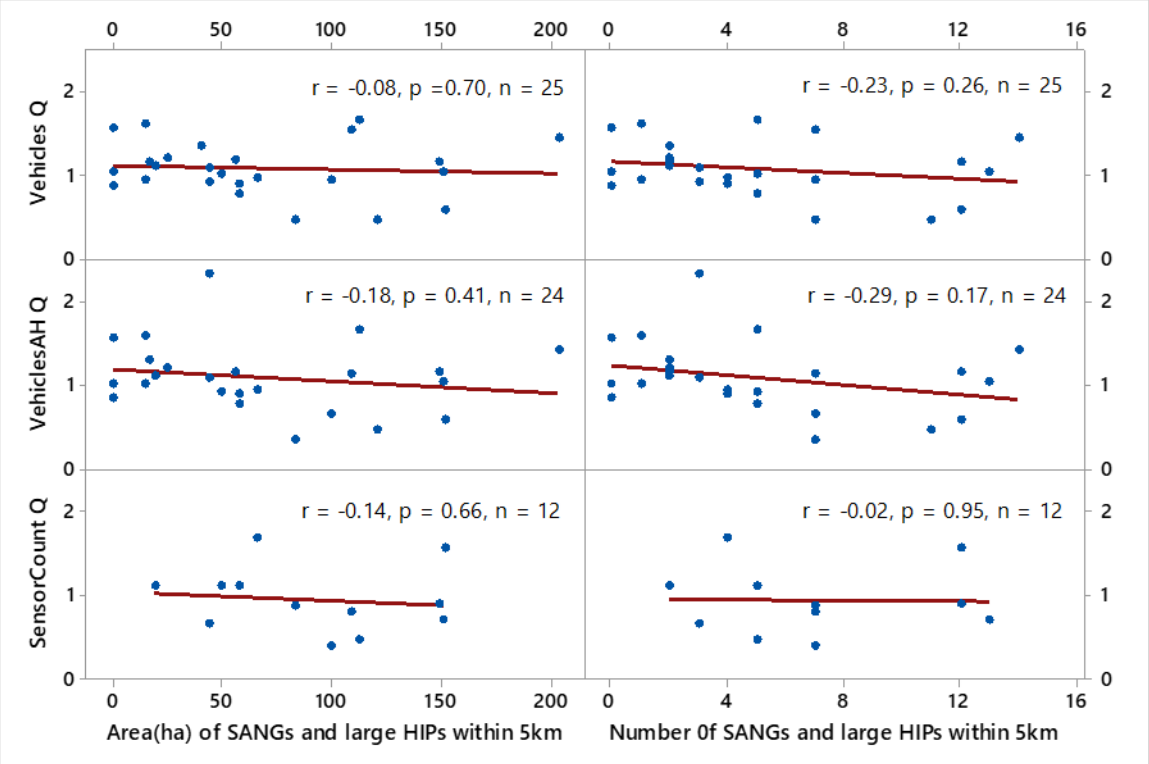


Figure 23 Relationship between Q measures of visitor increase relative to housing increases and either the total area or number of SANGS/large HIPs within 5km of the SSSI

2.144 In conclusion, this analysis suggests that there is insufficient evidence to suggest that the increase in visitor numbers relative to the increase in nearby housing around the heaths (as measured by Q) decreases with the total combined area or number of nearby SANGS and large HIPs. There is therefore no overall pattern of evidence that the introduction of more SANGS and HIPs has reduced overall visitor numbers to the SSSIs so far. The analysis is made difficult by the relatively small sample sizes and range of variation across the heaths in terms of visitor use, access infrastructure, promotion etc. Furthermore, the effectiveness of SANGs is likely to steadily increase with time. SANGs will take time to be well known destinations and landscaping, planting etc. will mean they improve with time. We have included a range of SANGs in the analysis, many of which have been implemented at different times and improved over time. This adds to the challenges in detecting an overall pattern.

Changes in visitor numbers to heaths in relation to housing change and SANG

There is no correlation between housing growth and visitor numbers on the heaths, i.e. those sites where visitor numbers have increased are not necessarily those with a greater level of housing change in their vicinity.

However, there are no clear results that demonstrate that the provision of SANGs/large HIPs has reduced overall visitor numbers to the heaths. There is insufficient evidence to suggest that the increase in vehicles or other measures of visitor use relative to the increase in housing nearby to heaths decreases with the total number or area of nearby SANGS and large HIPs. It should be noted that many SANGs are still in their infancy and that some of the survey results only reflect the early years for some SANG sites.

How have numbers of incidents (fires) changed (total number, extent and distribution)?

2.145 The mitigation officers and other partners keep records of any observed activities that are illegal, anti-social or potentially damaging to the heaths. This encompasses a wide range of activities such as fires (both accidental and deliberate), motorcycles, fly tipping, cyclists (off designated paths), camping, vandalism, drones and anti-social behaviour.

2.146 The recording of fires is based upon the logged call outs by Dorset and Wiltshire Fire and Rescue, with additional reporting by wardens, which covers any other burnt areas, or small campfires, which are otherwise missed in formal Fire and Rescue call out data. Map 22 shows the distribution of all fires across the Dorset Heaths from 2007-08 to 2019-20 and Map 23 shows the same data with graduated symbols to represent the area burnt.

2.147 Figure 24 shows the number of incidents recorded in each financial year from 2007-08 to 2019-20, split into fires and other incidents, and also the total area that was burnt. The total number of incidents appears to be lower for the past 5 years compared to the 8 years previous. However, given the large number of sites that this covers, there could be differences in recording effort from year to year (particularly in relation to the non-fire related incidents). This is because the number of staff on site, how much time they spent on site, and how much partners and members of the public have recorded incidents may change from year to year.

2.148 The area burnt by fires varies greatly over this period and does not always correlate to the number of fires recorded. Over half of the fires in this time period (57%) were less than $10m^2$, so the differences in total area burnt are often due to a small number of large fires. For example, in 2011-12 there was a large fire at Upton Heath (56.1 ha) and in 2014-15 there was a large fire at Town Common (46.9ha).

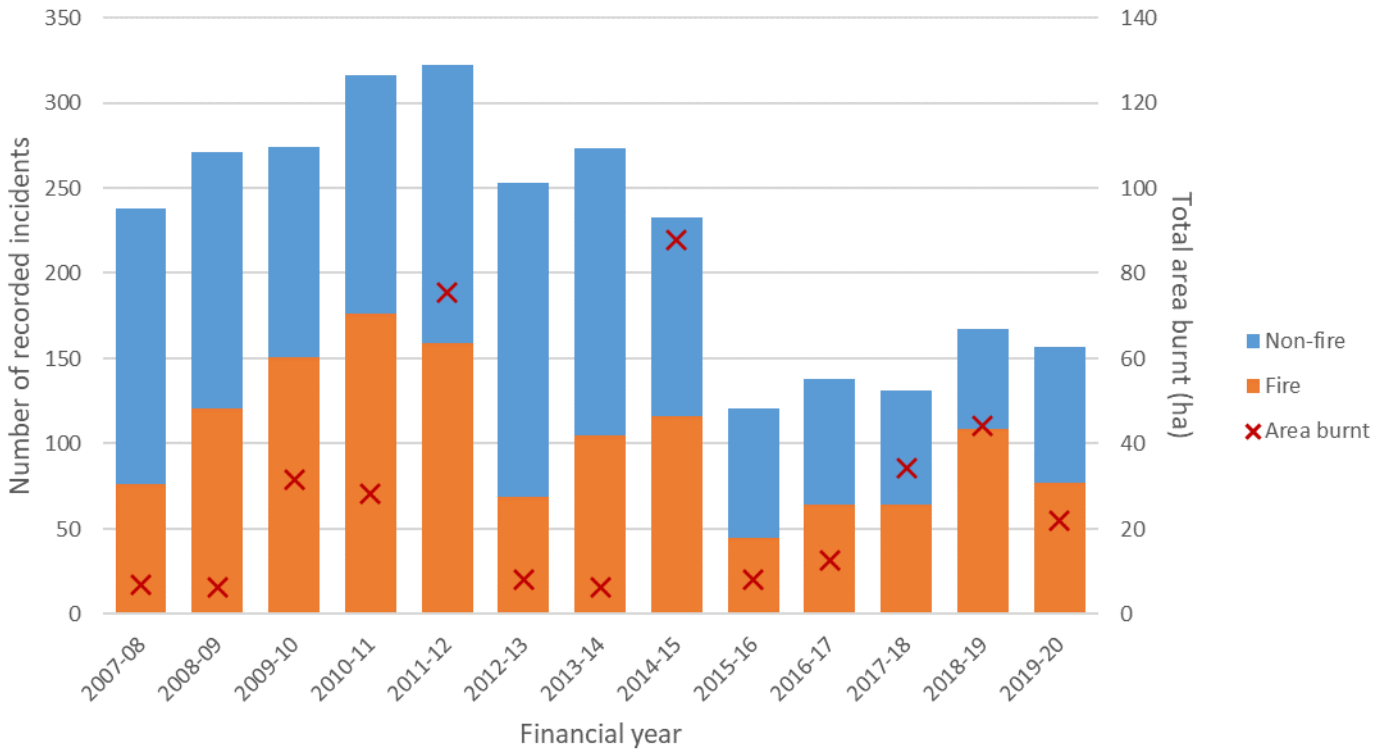


Figure 24: The number of incidents recorded per financial year (fires and other incidents) and the total area burnt by fires.

2.149 Map 24 shows the total number of fires within each SSSI, and Map 25 shows the total area burnt by fires on each SSSI. The SSSIs with the most fires recorded in this period were Bourne Valley (161), Ham Common (139) and Canford Heath (109). However, the SSSIs with the greatest area burnt by fires were Upton Heath (60.8 ha), Town Common (52.8 ha) and Povington and Grange Heaths (35.5 ha). 16 SSSIs did not have any fires recorded in this period.

2.150 A comparison of data for the financial years 2007/08 to 2009/10 and 2017/18 to 2019/20, by SSSI, is shown in Table 24. The data suggest a drop in the number of fires between 2007-10 (251 fires in total, an average of 83.7 per year) and 2017-20 (162 fires in total, an average of 54 per year). 15 sites had more fires in 2007-10 compared to 2017-20, while 10 sites had more in 2017-20. However, there is no evidence that the area burnt has decreased, with the area burnt being greater in 2017-20, with 76.1ha burnt (an average of 25.4ha per year) compared to 42.5ha (an average of 14.2ha per year). The area burnt had increased on 12 individual heaths while it had decreased on 7. The individual heaths where an increase has occurred include many of the more rural sites (such as Hartland Moor, Morden Bog & Hyde Heath, Povington & Grange, Stoborough & Grange and Studland & Godlingston).

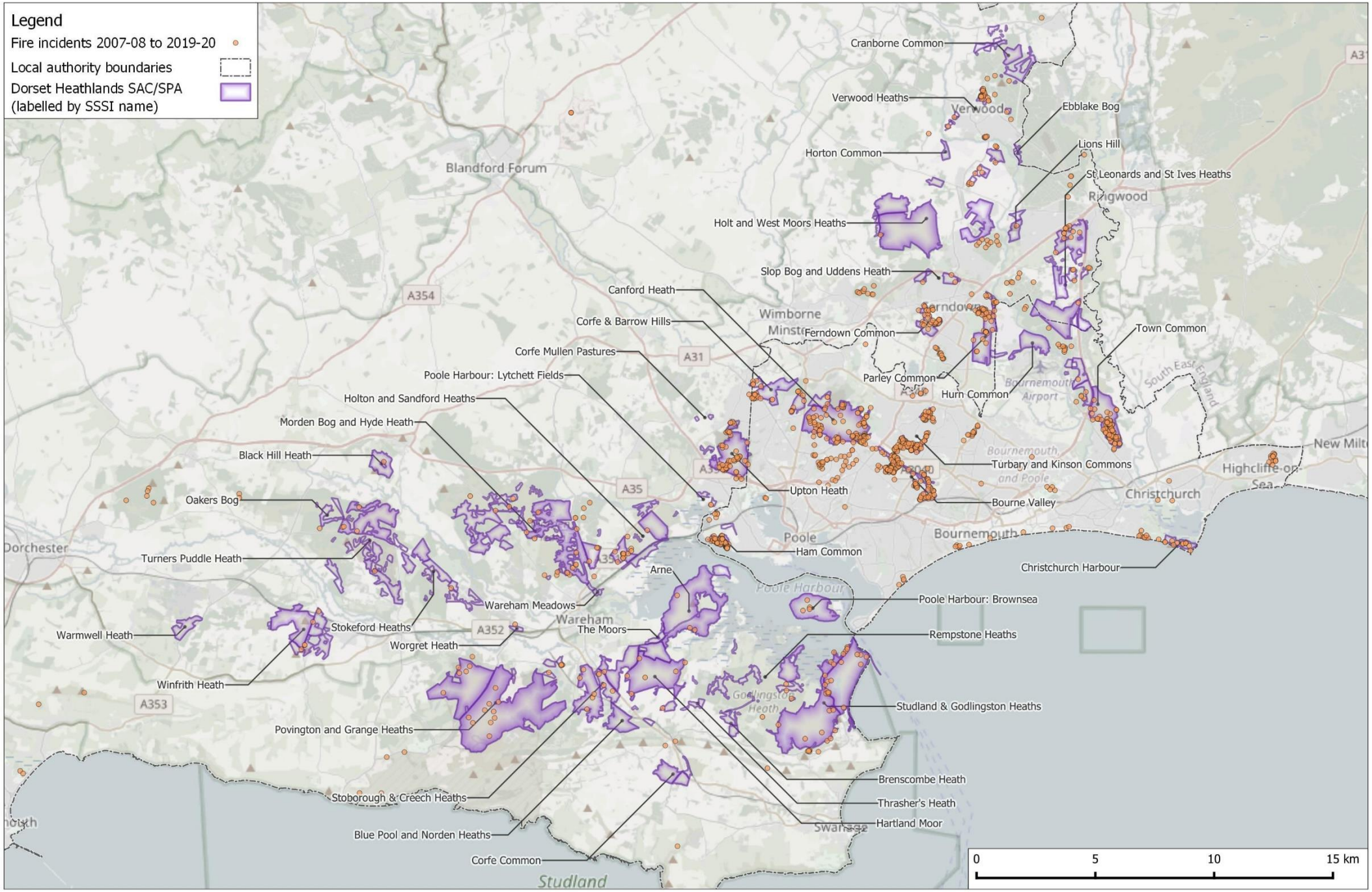
Table 24: Summary of the total number of fires, and area burnt by SSSI, for the 3 year periods 2007/08 to 2009/10, and 2017/18 to 2019/20. SSSIs which did not have fires recorded in this period are not included. The totals are only for fires located on SSSIs. Grey shading indicates the higher value in each pair of columns.

SSSI name	Mean number of fires			Mean total area burnt (ha)		
	2007-2010	2017-2020	Ratio	2007-2010	2017-2020	Ratio
Arne	0.0	0.7		0.0	0.3	
Black Hill Heath	0.0	0.0		0.0	0.0	
Bourne Valley	25.0	5.3	0.2	3.7	0.4	0.1
Canford Heath	14.7	5.3	0.4	1.2	0.0	0.0
Christchurch Harbour	0.3	0.0		0.0	0.0	
Corfe & Barrow Hills	3.7	1.3	0.4	1.2	0.0	0.0
Ferndown Common	2.0	1.0	0.5	0.1	5.1	98.3
Ham Common	11.3	13.3	1.2	0.2	0.2	1.0
Hartland Moor	0.3	1.3	4.0	0.0	1.6	268.2
Holt and West Moors Heaths	0.0	1.0		0.0	0.2	
Holton and Sandford Heaths	0.3	0.0		0.0	0.0	
Lions Hill	0.0	0.0		0.0	0.0	
Morden Bog and Hyde Heath	1.0	0.3	0.3	1.2	1.3	1.1
Parley Common	4.3	2.3	0.5	0.3	0.2	0.7
Poole Harbour: Brownsea	0.7	0.0		0.1	0.0	
Poole Harbour: Lytchett Fields	0.0	0.3		0.0	0.0	
Povington and Grange Heaths	0.0	2.3		0.0	3.9	
Slop Bog and Uddens Heath	0.3	0.0		0.2	0.0	
St Leonards and St Ives Heaths	0.0	1.7		0.0	0.0	
Stoborough & Creech Heaths	0.3	1.0	3.0	0.0	5.3	
Studland & Godlingston Heaths	2.0	1.0	0.5	3.8	4.9	1.3
Town Common	3.0	7.7	2.6	0.4	1.1	3.2
Turbary and Kinson Commons	5.7	4.0	0.7	0.0	0.1	1.8
Turners Puddle Heath	0.7	0.0		1.2	0.0	
Upton Heath	7.0	3.3	0.5	0.4	0.7	1.6
Verwood Heaths	1.0	0.0		0.1	0.0	
Winfrith Heath	0.0	0.7		0.0	0.0	
All sites	83.7	54	0.6	14.2	25.4	1.8

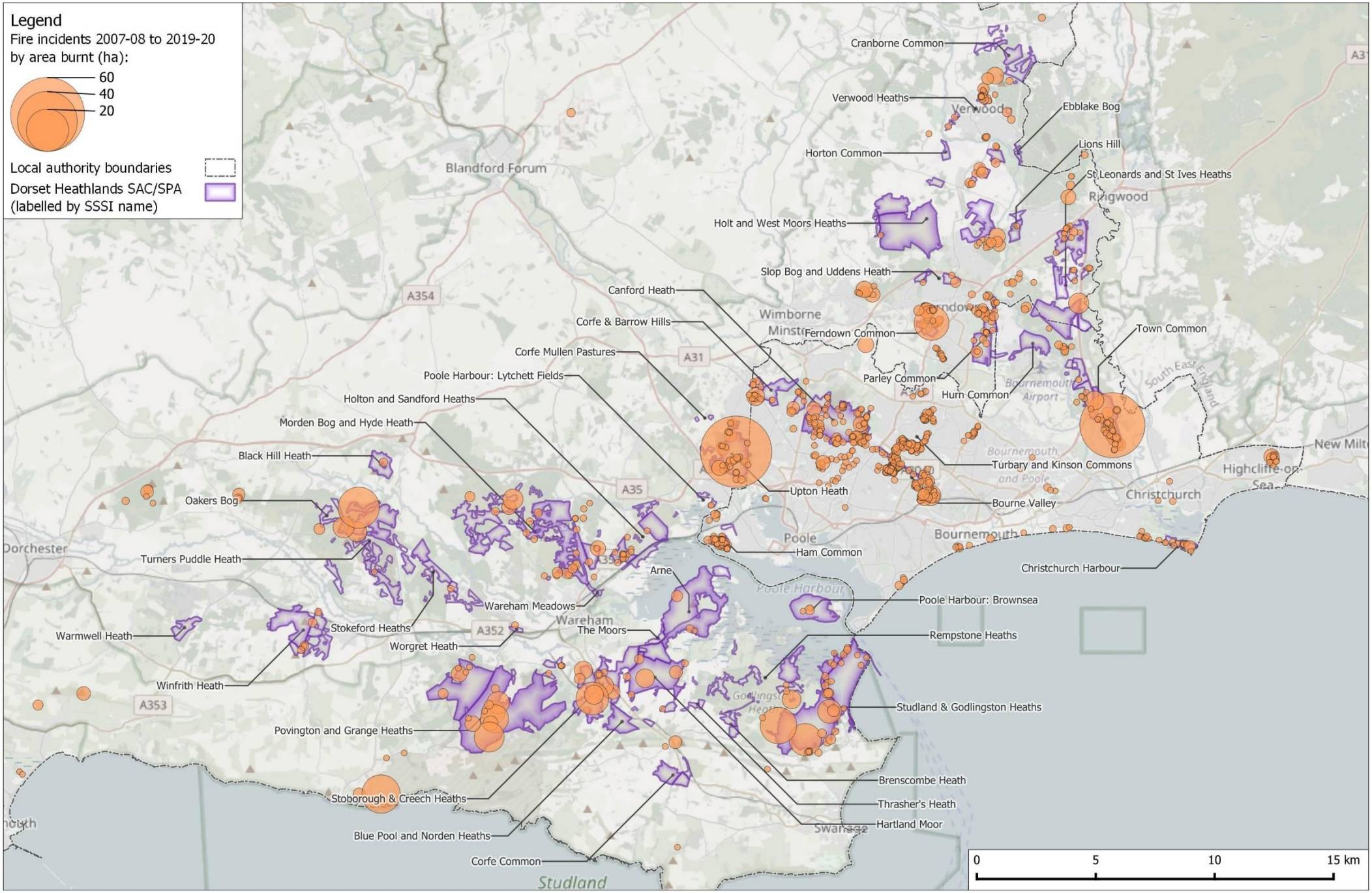
Number of incidents including fires on heathland sites over time

The number of incidents logged by wardens and number of fires has decreased since 2007. Fire incidence is still concentrated around the more urban heaths and despite the decrease continues to be a key threat to the Dorset Heaths. While fire incidence has decreased it appears that the area that has burnt has increased. This is in part due to a few very large fires and these have included a number of more rural heaths. The pattern of bigger fires highlights a key area of concern for the future.

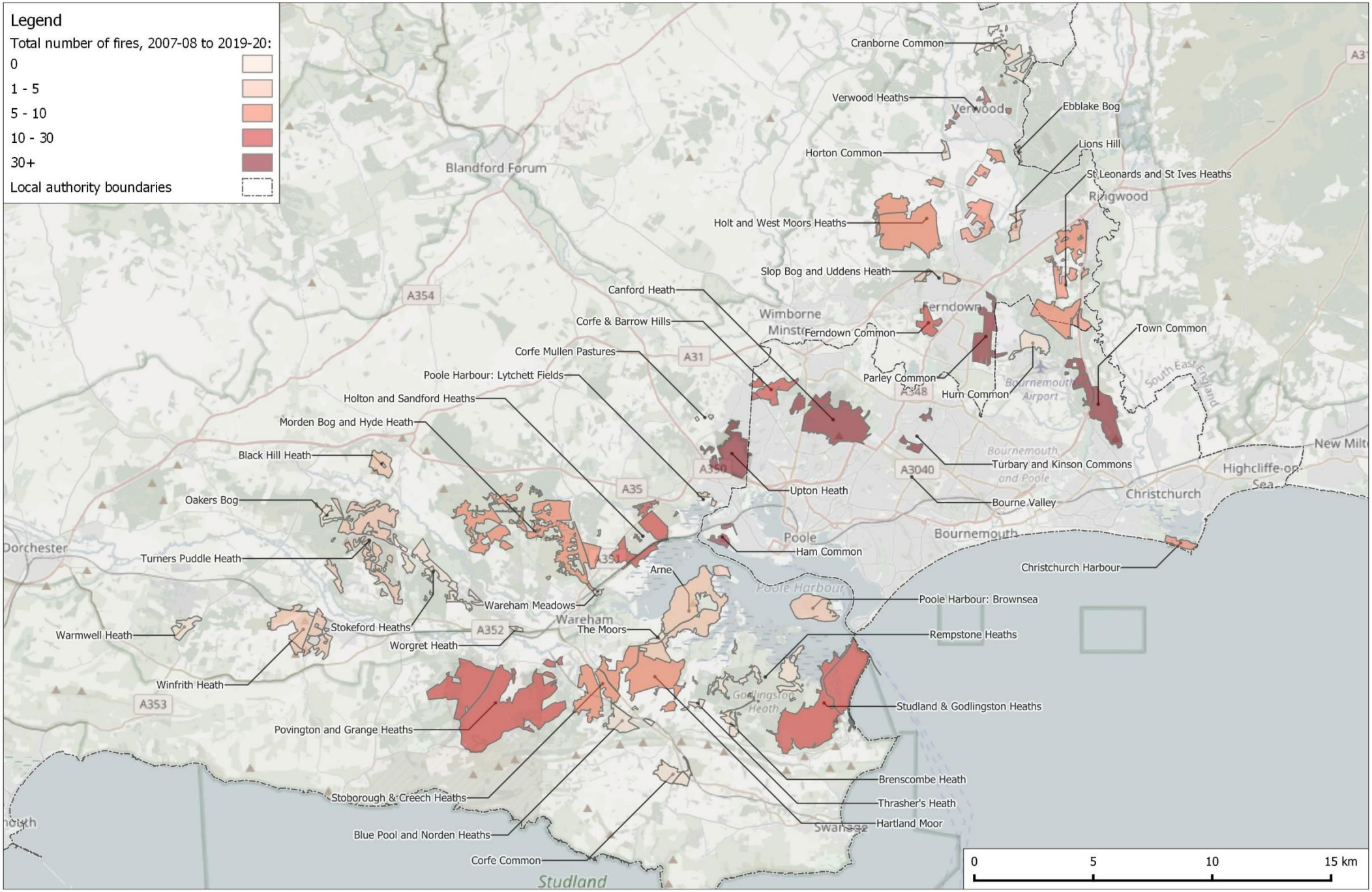
Map 22: Fire incidents 2007-08 to 2019-20



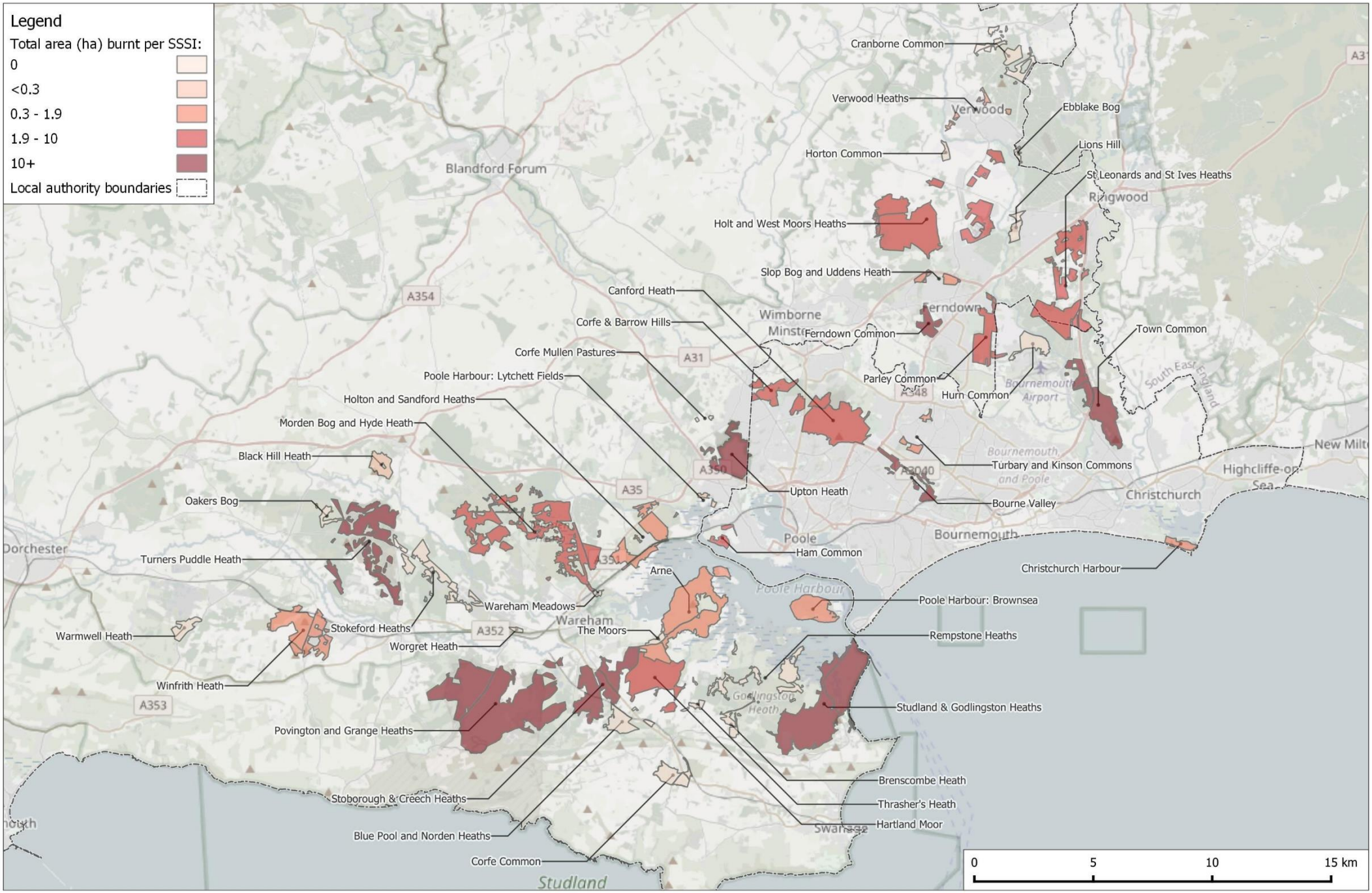
Map 23: Area burnt in fire incidents 2007-08 to 2019-20



Map 24: Number of fires per SSSI, 2007-08 to 2019-20



Map 25: Area burnt per SSSI, 2007-08 to 2019-20



How do changes in spatial distribution of incidents relate to changes in distribution of housing numbers, visitor numbers, SANG locations and education?

2.151 Plots of the ratio for fires (number of fires and area burnt) in relation to the relative change in housing or access are shown in Figure 25. These plots use the ratio values in Table 24 in relation to the respective ratios for the change in total housing within 5km, change in weighted housing and change in number of vehicles.

2.152 There was no significant correlation between the ratio for fire incidence and either the weighted housing ratio (Rank Spearman Correlation Coefficient =-0.217, n=27, p=0.278), or with the ratio for total housing within 5km (Rank Spearman Correlation Coefficient =-0.126, n=27, p=0.530, or with the ratio for total vehicles (Rank Spearman Correlation Coefficient = 0.259, n=23, p=0.233). Similarly, there was no evidence that the change in area burnt (the ratio) was correlated with the weighted housing ratio (Rank Spearman Correlation Coefficient =-0.151, n=27, p=0.453), or with the ratio for total housing within 5km (Rank Spearman Correlation Coefficient =0.017, n=27, p=0.931, or with the ratio for total vehicles (Rank Spearman Correlation Coefficient = 0.165, n=23, p=0.450). In order to calculate the correlation coefficients sites we included sites with no fires in a given period and ranked them accordingly[23]. These correlation coefficients suggest that the change in the number or area burnt on individual sites shows no consistent pattern in relation to housing change or the number of visitors (arriving by car).

[23] So for example a heath with 0 fires in the period 2007-10 and 5 fires in the period 2017-20 was ranked higher than a site 0 fires in the period 2007-10 and 2 fires in the period 2017-20.

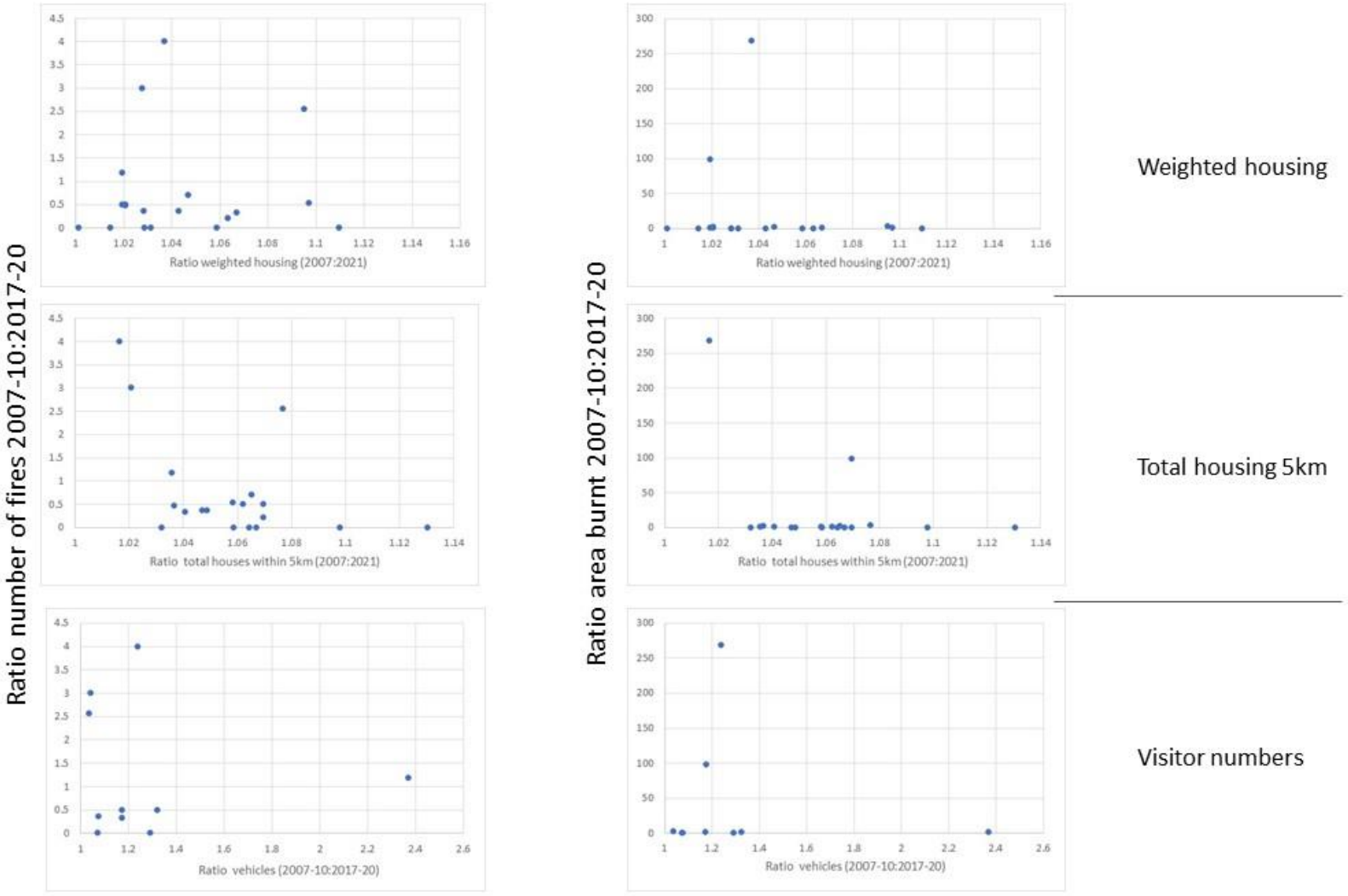


Figure 25: Change in the number of fires (left) or area burnt (right) in relation to the change in weighted housing (top), total housing within 5km (middle) and visitor numbers (bottom). Each point is a SSSI and the data presented are the ratio for fires in 2007-10:2017-20 and the respective ratio for housing or people change.

Changes in incidents in relation to housing and other variables

While fire incidence is clearly focussed around the more urban heaths, there is no evidence that the change in the number of fires or the change in the area burnt 2007-2021 is linked with housing change or visitor increases at individual heaths over the same period, i.e. the change in the number or area burnt on individual sites shows no consistent pattern in relation to housing change or change in the number of visitors (arriving by car).

How have SPA bird numbers changed?

2.153 The following sections describe patterns in the number of the three breeding SPA qualifying bird species (Dartford Warbler, Nightjar, and Woodlark) recorded from the Dorset heaths SSSI network using the monitoring data provided by the RSPB. It is important to note that survey effort has varied from year to year, with no surveys carried out in certain years for each species[24]. Furthermore, the survey locations used for monitoring often comprised component (sub)sites of larger SSSI complexes. As such, analyses have focussed on changes in absolute counts at survey localities between years.

Variation in bird numbers across survey locations

Dartford Warbler

2.154 Trend analysis of data from across the Dorset Heaths covering the period 1991-2013 showed the number of Dartford Warblers peaked around the year 2000 and remained high until 2009 when the population crashed as a result of cold winters, by 2013 reaching a similar level to that of the early 1990s (Liley and Fearnley, 2014).

2.155 Amongst the SSSIs/SSSI component sites for which more recent RSPB monitoring data were available (28 sites), Dartford Warblers were most abundant at Arne, Canford Heath, and Holt and West Moors Heaths SSSIs (see Figure 26). These sites consistently recorded greater numbers of this species across the study period, although numbers at Arne increased, and those at Holt and West Moors Heaths decreased, over the study period. A smaller number of territories (20+) were consistently recorded from Ferndown Common, Hartland Moor, Parley Common, St Leonards and St Ives Heaths, Town Common, and Upton Heath. Few, if any, birds were recorded from Blue Pool and Norden Heaths, Poole Harbour (Lytchett Fields), Slop Bog and Uddens Heath, Stokeford Heaths, Turners Puddle Heath, and Verwood Heaths (when surveyed).

2.156 Temporal trends in the count data vary. The Arne population decreased dramatically, following the harsh winter of 2009/10, before steadily recovering over the following five years. Similar decreases, following the 2009/10 winter, are observable in the data provided for Canford Heath, Holt and West Moors Heaths, Parley Common, Stoborough and Creech Heaths, Town Common, and Winfrith Heath. In general, with the exception of Arne (where overall the numbers have increased), the numbers of Dartford Warblers at individual sites appear to have either remained relatively static or decreased over the study period.

[24] Surveys were more standardised from 2014 onwards

Nightjar

2.157 Historic data for the period 1991-2013 (Liley and Fearnley, 2014) showed Nightjar territory numbers reaching a peak across the Dorset Heaths around 1996 before dropping. The data from 2010-2013 showed a steady rise.

2.158 At the 23 sites for which more recent data were available, Nightjars were most abundant across the study period at Arne, Canford Heath, and Holt and West Moors SSSIs (see Figure 27). Bourne Valley, Ham Common, Turbary and Kinson Commons, and Verwood Heaths all supported fewer birds than other sites.

2.159 Numbers at Arne decreased after 2009, prior to increasing steadily to a larger number by 2017. Numbers at Canford Heath and Holt and West Moors Heaths also show a decline and recovery over a similar time period. Although supporting different sized populations, the number of birds at Hurn Common, Lions Hill, Parley Common, and Verwood Heaths have remained relatively stable over the course of the study period, whilst Nightjar numbers at other sites (e.g. Povington and Grange Heaths, Stoborough and Creech Heaths, and Town Common) exhibit greater interannual variability.

Woodlark

2.160 Trend analysis of Woodlark data from the Dorset Heaths over the period 1991-2013 (Liley and Fearnley, 2014) showed marked fluctuations and variability between sites. Some of the key habitats for Woodlark are open areas in conifer plantations. As these areas are outside the SPA they are not monitored and the availability of clearfell habitats, dictated by forestry management, may have a strong influence on the occurrence of Woodlark on the heaths.

2.161 Woodlark were consistently recorded (i.e. absent in one or fewer survey years) from 7 of the 28 SSSIs for which recent monitoring data were available, namely: Arne, Holt and West Moors Heaths, Holton and Sandford Heaths, Hurn Common, Povington and Grange Heaths, St Leonard and St Ives Heaths, and Stoborough and Creech Heaths (See Figure 28). The largest number of birds (6+) were consistently recorded from St Leonards and St Ives Heaths, with a slightly smaller number (3 to 5 birds, on average) recorded consistently from both Arne and Hurn Common. A smaller number of birds (1 to 3) were regularly recorded from Holton and Sandford Heaths, Morden Bog and Hyde Heath, Parley Common, Povington and Grange Heaths, and Stoborough and Creech Heaths. The species was largely absent from/unsurveyed at the remaining localities, or only present sporadically in very small number.

2.162 It is difficult to identify temporal trends in the Woodlark data, although there is some indication of a decrease in numbers at Arne.

Changes in bird numbers between the start and end of the monitoring period

2.163 Table 25 describes the mean count of each of the three SPA qualifying species in the first three years of monitoring (with the exact period adjusted as indicated to allow for non-survey years) and the mean count for the most recent three years for which data were available (2017 to 2019). The ratio (B) of these two values is then given for each of the named SSSIs, with ratios of >1 indicating an increase in the intervening period and ratios of <1 a decrease. Means and ratios were calculated for all sites which had a minimum of two years' worth of data in the first three years of monitoring, in order to avoid excluding the majority of locations. The ratio of average bird numbers in the last 3 years relative to in the first three years was greater than one (i.e. bird numbers increased) in 6 of 18 SSSI for Dartford Warbler, 16 of 17 SSSI for Nightjar and 6 of 14 SSSI for Woodlark (2 SSSI showed no change for Woodlark). Thus the vast majority of SSSI have increased in numbers of Nightjar but there is no overall trend for either Dartford Warbler or Woodlark. A wide range of factors will have influenced the relative changes in bird numbers on the individual sites, including site habitat quality and visitor management as discussed elsewhere in this report.

2.164 The table shows that Dartford Warbler territory numbers have increased at Bourne Valley, Holton and Sandford Heaths, Hurn Common, Lions Hill, Povington and Grange Heaths, and St Leonards and St Ives Heaths SSSIs. The largest increases were seen at Hurn Common and Holton and Sandford Heaths SSSIs, where numbers have more than doubled. The species has decreased at all other surveyed sites, with the largest decreases seen at Turbary and Kinson Commons (a total loss), the Verwood Heaths and Holt and West Moors Heaths (both having halved).

2.165 Nightjar territory numbers have increased at all surveyed SSSIs, with the exception of Lions Hill. The largest increase was at Bourne Valley (where the mean tripled), with the mean number of birds also more than doubling at Morden Bog and Hyde Heath.

2.166 Woodlark have increased at five of the nine SSSIs for which it was possible to calculate mean values and ratios of change (Holt and West Moors Heaths, Holton and Sandford Heaths, Parley Common, Stoborough and Creech Heaths, and Upton Heath), with the largest increase seen at the latter site. Numbers remained the same at Morden Bog and Hyde Heath and St Leonards and St Ives Heaths, with the species disappearing completely from both Verwood Heaths and Winfrith Heath.

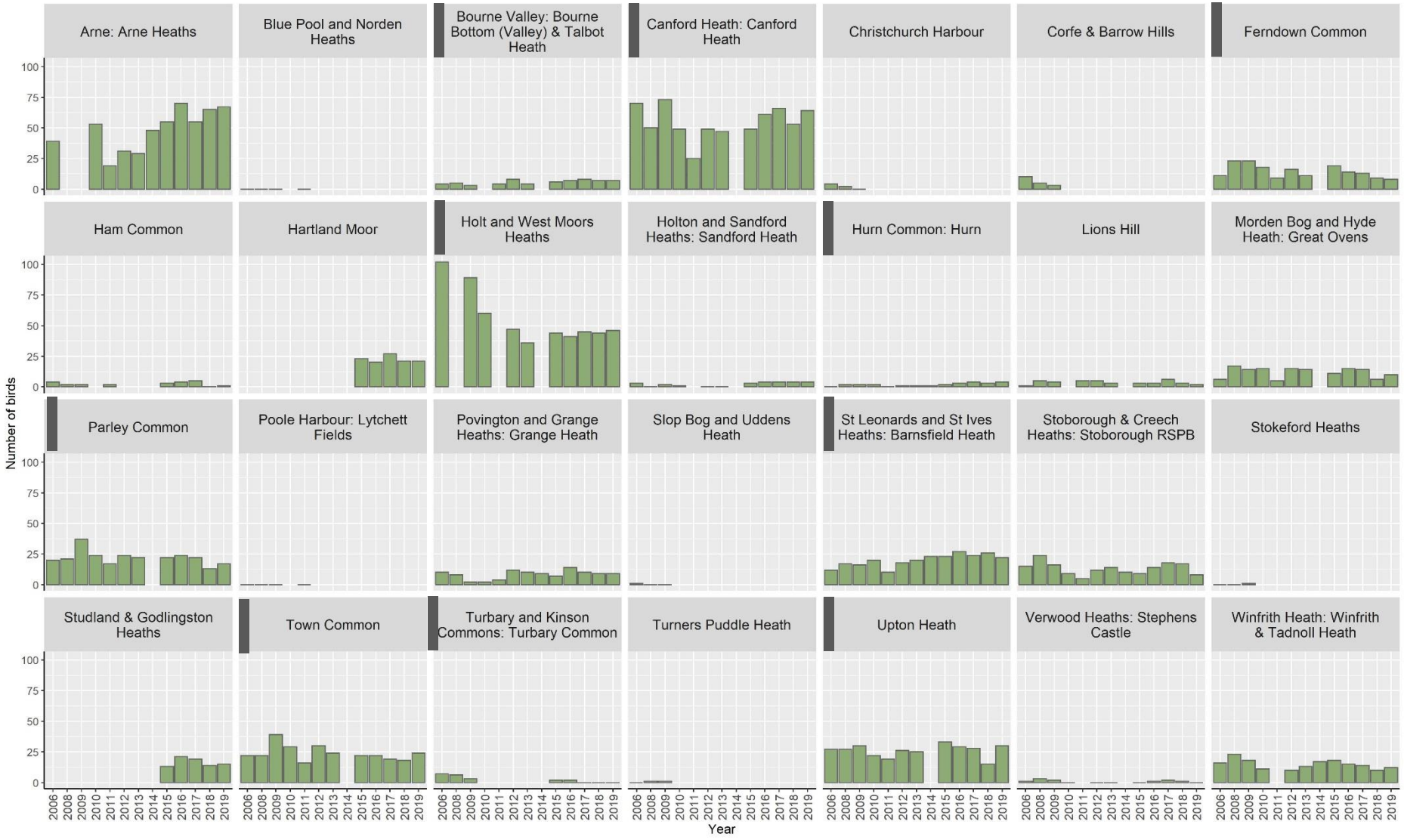


Figure 26: Numbers of Dartford Warbler, 2006 - 2019, by site (note that no surveys were carried out in 2007, with that year excluded from the figure). Data have been pooled, where possible, for SSSIs formed from multiple component survey sites (indicated by the use of colons). Dark grey bars indicate more urban sites (all have at least 30,000 homes within 5km of the boundary).

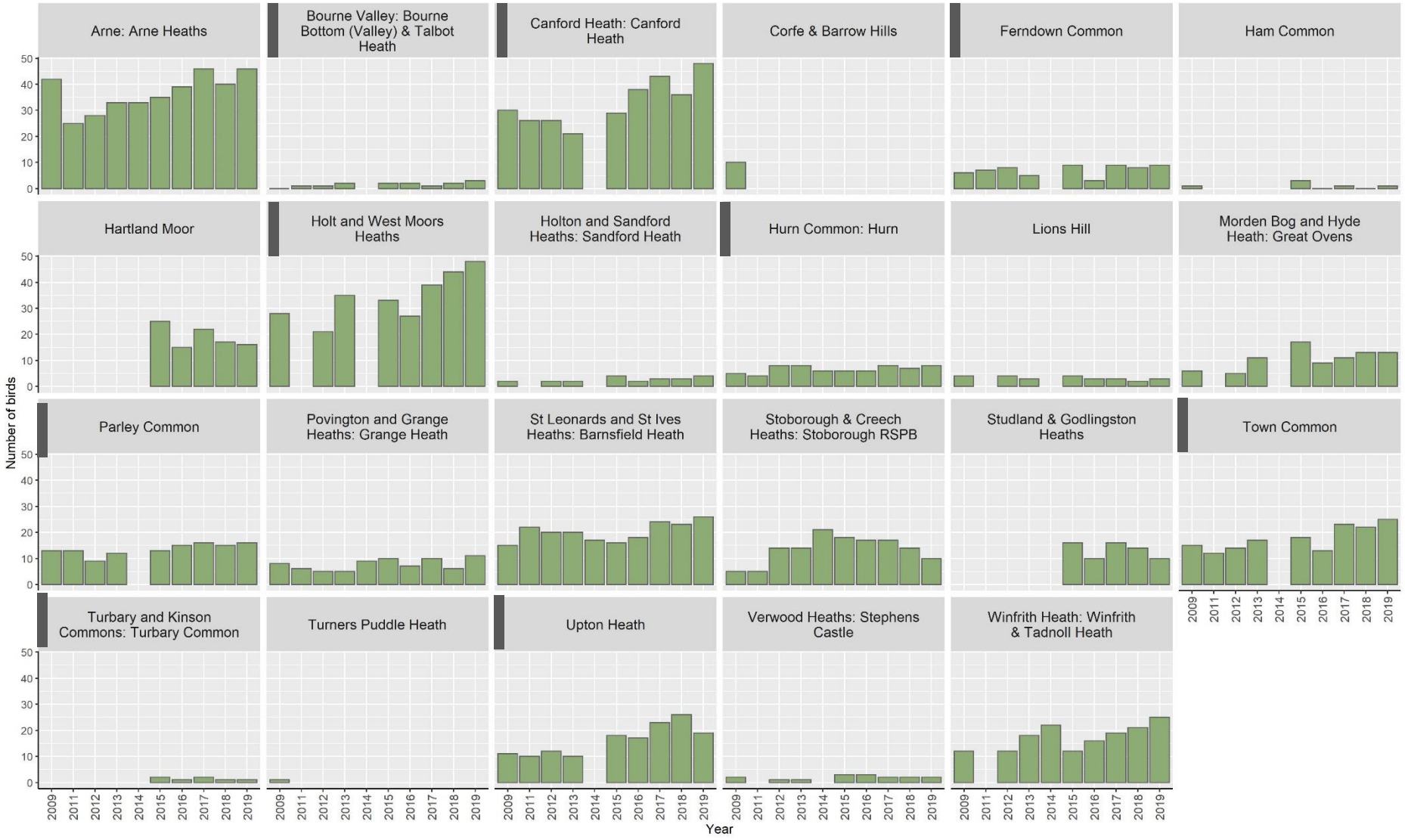


Figure 27: Numbers of Nightjar 2009 - 2019 by site (note that no surveys were carried out in 2010, with that year excluded from the figure). Data have been pooled, where possible, for SSSIs formed from multiple component survey sites (indicated by the use of colons). Dark grey bars indicate more urban sites (all have at least 30,000 homes within 5km of the boundary).

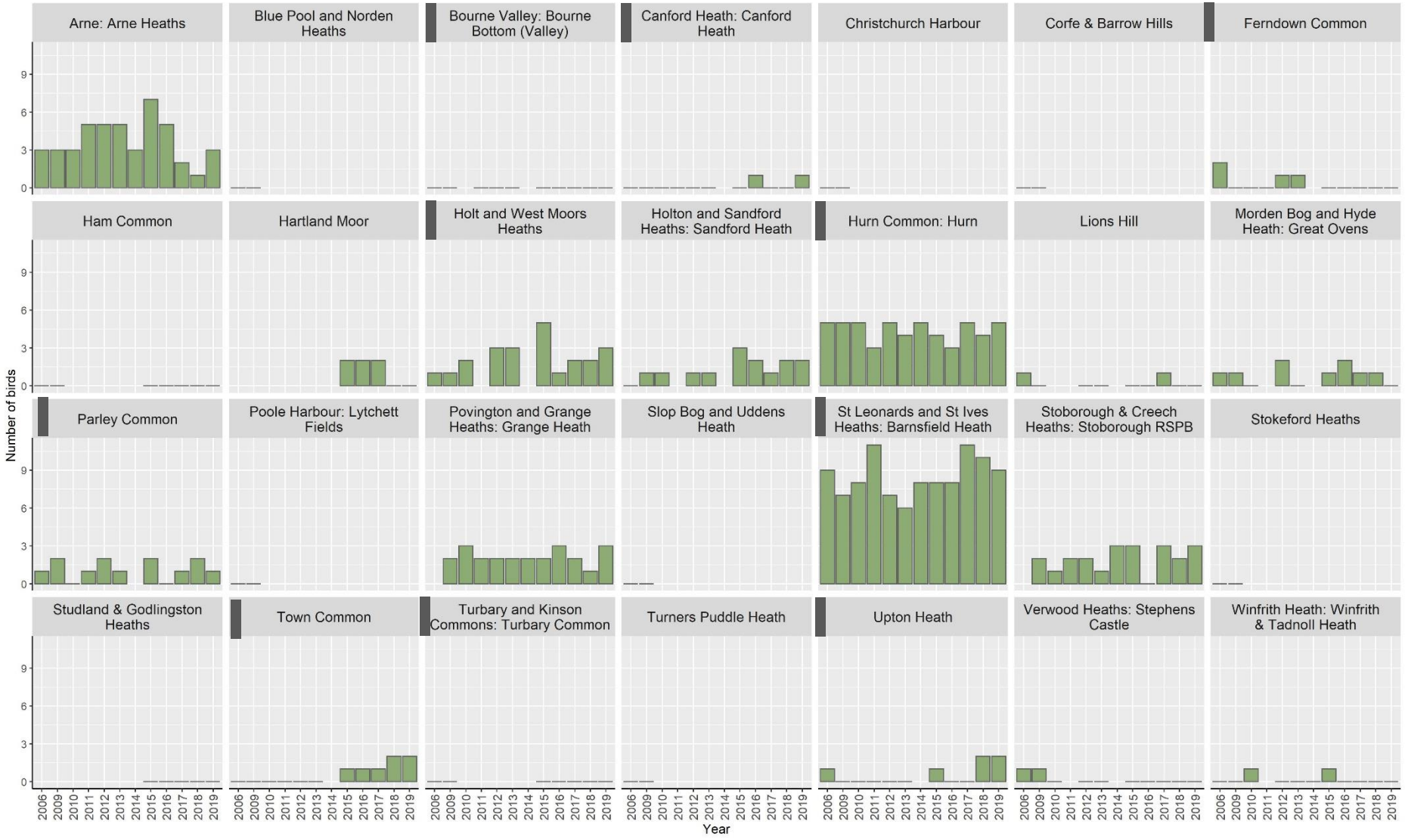


Figure 28: Numbers of Woodlark 2006 – 2019 by site (note that no surveys were carried out in 2007 or 2008, with those years excluded from the figure). Data have been pooled, where possible, for SSSIs formed from multiple component survey sites (indicated by the use of colons). Dark grey bars indicate more urban sites (all have at least 30,000 homes within 5km of the boundary).

Table 25: Mean counts (and range) of SPA qualifying species for the first 3-years and most recent 3-years of RSPB monitoring data (excluding years without survey) for the Dorset heaths SSSI network, and colour-coded ratios of the two mean values. Those ratios of >1 (reds) indicate an increase in the population between the two periods whilst those <1 indicate a decrease (blues). Blank cells indicate non-survey periods for the site in question.

SSSI	Dartford Warbler					Nightjar					Woodlark				
	3-year mean count (RSPB site totals - 2006, 2008, & 2009)	Range	3-year mean count (RSPB site totals - 2017 to 2019)	Range	Ratio of 3-year mean counts	3-year mean count (RSPB site totals - 2009, 2011, & 2012)	Range	3-year mean count (RSPB site totals - 2017 to 2019)	Range	Ratio of 3-year mean counts	3-year mean count (RSPB site totals - 2006, 2009, & 2010)	Range	3-year mean count (RSPB site totals - 2017 to 2019)	Range	Ratio of 3-year mean counts
Arne						31.7	25-42	44.0	40-46	1.4	3.0	3-3	2.0	1-3	0.7
Bourne Valley	4.0	3-5	7.3	7-8	1.8	0.7	0-1	2.0	1-3	3.0					
Canford Heath	73.0	59-81	64.7	56-70	0.9	27.3	26-30	42.3	36-48	1.5					
Ferndown Common	19.0	11-23	10.0	8-13	0.5	7.0	6-8	8.7	8-9	1.2	0.7	0-2	0.0	0-0	0.0
Ham Common	2.7	2-4	2.0	0-5	0.8										
Holt and West Moors Heaths	95.5	89-102	45.0	44-46	0.5	24.5	21-28	43.7	39-48	1.8	1.3	1-2	2.3	2-3	1.8
Holton and Sandford Heaths	1.7	0-3	4.0	4-4	2.4	2.0	2-2	3.3	3-4	1.7	0.7	0-1	1.7	1-2	2.5
Hurn Common	1.3	0-2	3.7	3-4	2.8	5.7	4-8	7.7	7-8	1.4	5.0	5-5	4.7	4-5	0.9
Lions Hill	3.3	1-5	3.7	2-6	1.1	4.0	4-4	2.7	2-3	0.7	0.5	0-1	0.3	0-1	0.7
Morden Bog and Hyde Heath	12.3	6-17	10.0	6-14	0.8	5.5	5-6	12.3	11-13	2.2	0.7	0-1	0.7	0-1	1.0
Parley Common	26.0	20-37	17.3	13-22	0.7	11.7	9-13	15.7	15-16	1.3	1.0	0-2	1.3	1-2	1.3
Povington and Grange Heaths	6.7	2-10	9.3	9-10	1.4	6.3	5-8	9.0	6-11	1.4	2.5	2-3	2.0	1-3	0.8

SSSI	Dartford Warbler					Nightjar					Woodlark				
	3-year mean count (RSPB site totals - 2006, 2008, & 2009)	Range	3-year mean count (RSPB site totals - 2017 to 2019)	Range	Ratio of 3-year mean counts	3-year mean count (RSPB site totals - 2009, 2011, & 2012)	Range	3-year mean count (RSPB site totals - 2017 to 2019)	Range	Ratio of 3-year mean counts	3-year mean count (RSPB site totals - 2006, 2009, & 2010)	Range	3-year mean count (RSPB site totals - 2017 to 2019)	Range	Ratio of 3-year mean counts
St Leonards and St Ives Heaths	33.0	17-34	34.7	33-38	1.1	34.7	34-35	41.7	41-42	1.2	16.3	15-18	16.3	16-17	1.0
Stoborough & Creech Heaths	18.3	15-24	14.3	8-18	0.8	8.0	5-14	13.7	10-17	1.7	1.5	1-2	2.7	2-3	1.8
Town Common	27.7	22-39	20.3	18-24	0.7	13.7	12-15	23.3	22-25	1.7	0	0	1.7	1-2	
Turbary & Kinson Commons	5.3	3-7	0.0	0-0	0.0	0	0	1.3	1-2		0	0	0	0	
Upton Heath	28.0	27-30	24.3	15-30	0.9	11.0	10-12	22.7	19-26	2.1	0.3	0-1	1.3	0-2	4.0
Verwood Heaths	2.0	1-3	1.0	0-2	0.5	1.5	1-2	2.0	2-2	1.3	0.7	0-1	0.0	0-0	0.0
Winfrith Heath	19.0	16-23	12.0	10-14	0.6	12.0	12-12	21.7	19-25	1.8	0.3	0-1	0.0	0-0	0.0
Number of heaths with data					**18**					**17**					**14**
Number of heaths with increase					**6**					**16**					**5**

Changes in SPA bird numbers

Monitoring data were available from 28 SSSIs for Dartford Warbler, 23 for Nightjar, and 28 for Woodlark. Nevertheless, much of the time series was patchy.

The largest numbers of Dartford Warblers and Nightjars were consistently present at Arne, Canford Heath, and Holt and West Moors Heaths (i.e. the larger sites). The largest numbers of Woodlark were present at Arne, Hurn Common, and St Leonards and St Ives Heaths.

Temporal trends vary between species and sites. Dartford Warbler numbers declined at several key sites following extreme winter weather in 2009/10, prior to largely recovering, but there is no clear overall pattern and there have been decreases at some sites. Nightjars have been increasing across the majority of monitored locations during the study period, whilst any trend across sites for Woodlark is less clear cut (with often low numbers and some fluctuations between years at many sites).

How do changes in spatial distribution of birds relate to changes in distribution of housing and visitor numbers?

2.167 Figure 26 , Figure 27 and Figure 28 (above) show the changes in bird numbers at individual heaths and highlight the more urban sites. We have used a threshold of 30,000 houses within 5km (the approximate mid-point of the data) to derive the split. Comparing these urban and more rural sites, no obvious pattern is apparent in the data for Dartford Warbler, with numbers largely remaining stable within individual SSSIs across the study period, despite some interannual variation. The obvious exceptions to this comprise the increasing/recovering populations at Canford Heath (an 'urban') and Arne (a 'rural' SSSI). Similarly, Nightjar appear to be increasing at the majority of localities, irrespective of the level of surrounding urbanisation. Again, it is difficult to detect any clear trend in the Woodlark dataset.

2.168 There was no significant correlation between the ratio in the weighted housing variable (2007:2021) and the ratio for any of the bird species (Figure 29). This indicates there is no correlation between housing growth and bird numbers, i.e. changes in bird numbers do not match changes in housing around individual heaths. Similarly, there was no significant correlation between the ratio of vehicles (heath only access points, excluding destination car parks with major facilities, average 2010-2013:2017-2020) and the ratio for any of the bird species (Figure 29). This indicates there is no correlation between the change in visitor numbers (using

vehicle counts as a proxy) and changes in bird numbers, i.e. changes in bird numbers do not match changes in visitor use.

2.169 Previous analyses (2.135 - 2.144) indicated that there was no overall tendency for the increase in heath visitors relative to nearby housing increases to be less for heaths with a large number or area of nearby large HIPs/SANGs. It is however still possible that the development of SANGs and large HIPs may have helped bird numbers. For instance, if SANGs have worked to deflect particular kinds of visitors that such as dog walkers that have a particular impact, then it would be possible for Large HIPs or SANGs to have a positive effect on bird numbers, even if no pattern in visitor numbers is evident.

2.170 The relationship between bird numbers change ratio (B) and either the total combined area or number of SANGS and large HIPs within 5km of the SSSI is shown in Figure 29. None of the correlations were statistically significant (for all tests $p>0.20$). The correlations between the weighted area of SANGS and large HIPs and each of the three bird species change ratios (B) were also not statistically significant (all $p>0.10$).

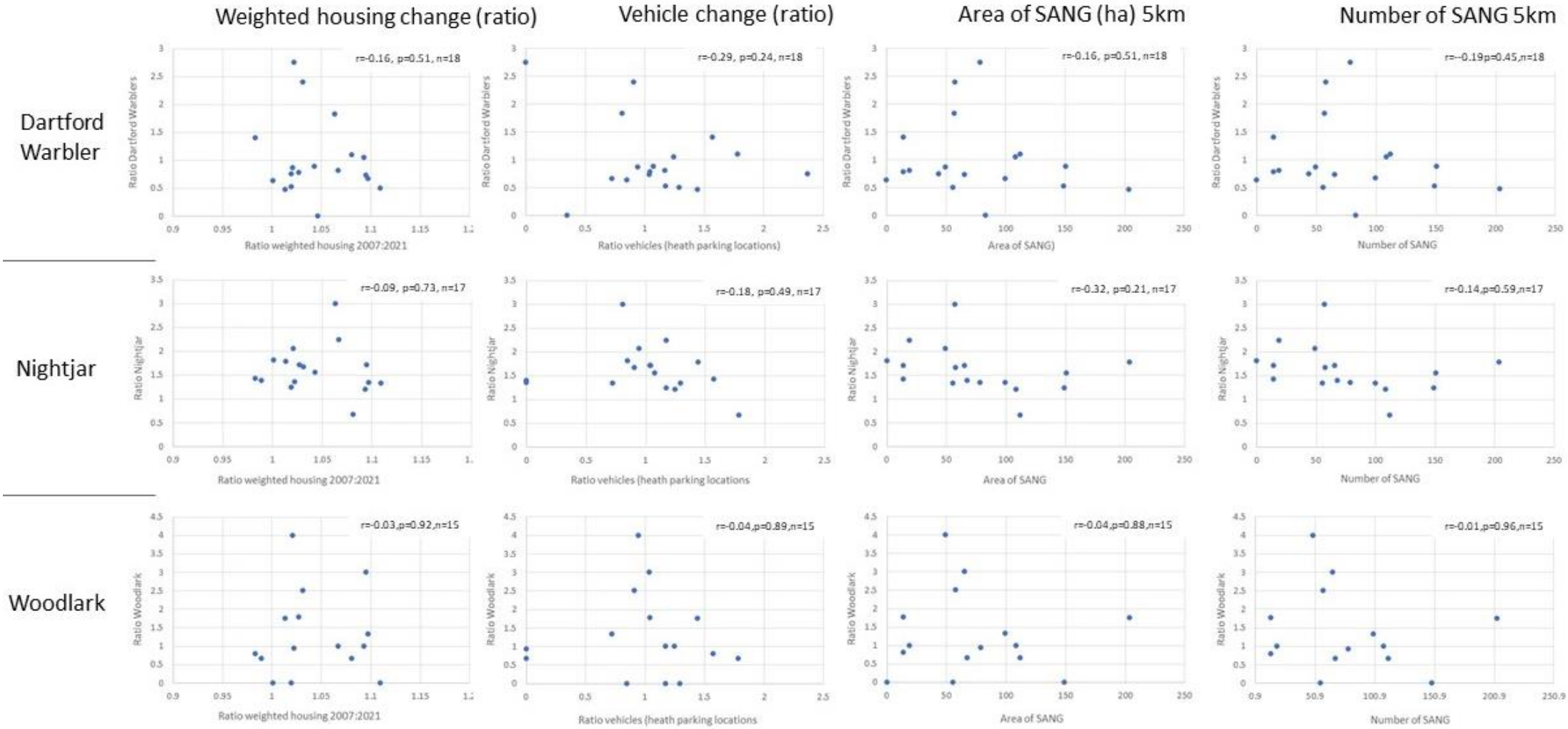


Figure 29: Relationship between bird numbers change ratio B and the ratio of change in weighted housing, ratio of change in visitors (vehicles at heath access points) and large HIPs/SANGs (total area or total number within 5km) for each bird sp. (Correlation (r), test p value, number of heaths (n))

Changes in bird numbers and distribution in relation to housing and other variables

There is no evidence that bird numbers (of any of the three Annex I species) have changed differentially on sites with a greater change in housing or more visitors or more SANG around them. Any such analysis is made difficult by the limited sample size and the wide range of factors likely to be affecting the birds.

3. Implications for Mitigation Delivery and Planning Policy

3.1 In this section, we consider the implications for future mitigation delivery in light of the potential future housing growth in emerging local plans for Dorset and BCP Councils.

Implications for mitigation

What new issues and challenges will arise?

3.2 Housing growth is likely to be focused around the conurbation and forecasted levels of growth potential far outpace that seen in recent years. House building may reduce the space available for recreation as well as increasing the amount of people in the area. Countryside sites need to be able to provide for regular local access as well as people exploring further afield.

3.3 The data show an increase in the number of visitors to heaths since 2007 and an even more marked increase in use of SANGs and visitor attractions sites. National data show that the use of the countryside for recreation has increased in the UK (e.g. O'Neill, 2019) and as such even without an increase in housing, an increase in visitor numbers is to have been expected. While we have largely used data from before Covid, the pandemic has had a marked effect on how people use local greenspaces (Burnett et al., 2021; Natural England and Kantar Public, 2021; Randler et al., 2020). There is a continued and growing importance of urban green spaces in particular as spaces to connect with nature and each other (Natural England and Kantar Public, 2021).

3.4 Looking to the future it is not clear how patterns of use will change following the pandemic and climate change is also likely to be a driver of change in recreational use (Coombes and Jones, 2010; McEvoy et al., 2008).

3.5 Dog walking (e.g. Figure 30d) is one of the main recreation uses of the heaths (accounting for 74% of interviewees in Panter and Caals, 2020a) and a particular issue in terms of bird disturbance, dog fouling and managing livestock. Dog ownership has increased during Covid (Morgan et al., 2020), with many additional households acquiring a dog and potentially discovering local dog walking sites for the first time.

3.6 It is possible that people have discovered new recreation opportunities close to home and will continue to make use of them. The rising costs of living may mean people are choosing to spend more of their recreation time close to home and on their doorstep. With changing weather patterns associated with climate change,

access patterns may further change. Climate change also brings particular risks in relation to fire incidence.

3.7 In addition, the awareness of climate change issues, costs of travel and potential restrictions on travel associated with the pandemic may result in changes in how people travel, with people preferring to stay local and utilise more environmentally friendly forms of travel, such as electric cars or active travel such as by bike. There is a fast-growing trend for ebike use that makes longer cycle routes possible for many.

3.8 Alongside the growth in ebikes, night cycling and cycling groups are becoming more common (e.g. Figure 30e), and such groups may make use of trains or drive to reach suitable starting points from which to ride. Certain locations (such as the clay pit at Upton Heath, Figure 30b) are a focus for dirt jump cycling and mountain bike use.

3.9 Use of canoes and paddleboards is also increasing, and while such activities are clearly not heathland focussed, it does mean that some of the more remote heathland areas such as Arne and the Poole Harbour shore at Studland are vulnerable, with the key concern being fire risk from people paddling out to have a barbeque or fire on the shoreline.

3.10 One of the particular challenges is the effect of social media which can rapidly reach a wide audience and promote activities or places in ways which may be unexpected or result in particular surges in visitor use. Effective use of social media will be an increasingly important part of the mitigation toolkit and is likely to require increasing amounts of staff time. There is scope for UHP and partners to make greater use of social media across various platforms and increase their reach and following.

3.11 It is interesting to note that the increases in recreation use are particularly associated with the spring school holiday, spring weekends and the spring and summer bank holidays, potentially indicating some effects of tourism (it could even be that tourism to the coast deflects local visitors to the heaths). The mitigation strategy encompasses tourism and in recent years there have been a range of new camping and tourist accommodation opening around the heaths. Where such accommodation is directly adjacent to heaths (e.g. Figure 30a) it is likely to result in marked spikes in recreational use and potentially a fire risk. Further risks relate to wild camping and informal gatherings which have become more common place as a result of Covid. Litter (e.g. Figure 30f), fire, contamination and perhaps disturbance are the key risks associated with such use. The extent to which the pandemic will influence holiday patterns in future years is hard to determine, but there is likely to be growing demand.

3.12 A further challenge for long-term mitigation is the cross-over between different European sites and different mitigation strategies. With strategic approaches developing or in place to address recreation impacts from new housing for Chesil and the Fleet, the New Forest, Poole Harbour and the Solent there is likely to be a need to address how the different overlapping areas might work. We know from visitor data that people will visit a range of different locations, and as such it may be that new development in an overlap zone might need to contribute to SAMM on different European sites. How SANG provision might work where there are multiple European sites is a more challenging consideration and it may be that particular design criteria or guidelines may be relevant for different European sites (e.g. coast or heath). SANGs are likely to work to deflect visitors from multiple European sites and larger, more destination SANGs are likely to have a particular role in this regard.

3.13 We have presented and summarised bird data for the breeding bird interest of the Dorset Heathlands SPA. Climate has a marked impact on the ecology and – as the Dartford Warbler data show –on the qualifying features of the Dorset Heathlands SPA. Over time the abundance and distribution of key species will change, and conservation priorities will shift. The latest UK list of Birds of Conservation Concern (BoCC), the 5th UK wide assessment (Stanbury et al., 2021) assesses Nightjar and Dartford Warbler as Amber listed and Woodlark as Green listed. All three species in previous assessments have been Red listed and the current assessment reflects a generally positive national picture for these species.

3.14 There have been various changes in the conservation management of the heaths over the time covered in this report, which will also influence both the species of interest and access patterns. Changes have included the new Purbeck Heathlands NNR which has led to linked management (of both visitors and the habitat) across heathland sites previously fragmented by large conifer blocks (which were felled around 2010). The National Heritage Lottery Funded Back from the Brink project has been undertaking bare ground creation and targeted management across heathland sites over the period 2017-2020, measures particularly targeted towards species such as Woodlark.

Figure 30: Selected images of particular issues: a) temporary campsite adjacent to heath; b) bike jumps at Upton Heath; c) heath fire; d) dog walkers at Slepe Heath; e) Group of mountain bikers crossing wet heath; f) litter from barbeque /gathering on edge of heath.

What can be learned from comparison with other mitigation schemes?

3.15 In other parts of the UK, following Dorset's lead, strategic approaches to mitigation have been established to address recreation and urban effects. Many of these schemes now regularly meet to exchange ideas, approaches and techniques.

3.16 A suite of mitigation measures should function together to have confidence that adverse effects arising from recreation have been prevented. This is because the combination of measures working together reduces risk and builds in contingency for amending the strategy if some measures do not perform as well as envisaged, once implemented. Other measures can still be functioning in the short term whilst some are revised. An integrated suite of measures delivered together also improves efficiency, which in turn adds to effectiveness with improved value for money.

3.17 Rangers and infrastructure projects (including SANGs) are common themes in strategic mitigation for European sites, and all schemes also include monitoring to target and hone interventions. Other measures within these schemes have included dog projects, interpretation, changes to infrastructure, codes of conduct and various engagement approaches. Many of these interventions are widespread and commonly used and there are a range of studies that support their effectiveness (e.g. Allinson, 2018; Burger and Leonard, 2000; Medeiros et al., 2007; Williams et al., 2017), however there is little experimental work or similar to explicitly test or compare how well different interventions work.

3.18 Many of the measures bring wider benefits besides simply providing mitigation. Enhancing access, providing better connections between local people and their environment, providing education resources and providing new green infrastructure all have wide benefits for society and potential economic benefits. SANGs also have the potential to provide a range of ecosystem services, for example through flood protection, carbon sequestration or enhanced water quality (for example by taking land out of intensive agriculture).

3.19 An overview of a range of different mitigation schemes is provided in Appendix 5. Key points to draw from the appendix include:

- Many schemes are long running and have developed and grown over time;
- Schemes are in place across the country and relate to a range of SAC and SPA sites and different issues;
- Mitigation approaches vary, with a package of measures tailored to each individual site – there is no set package or standard approach;
- In some cases the scheme is set out in a joint SPD that covers multiple local planning authorities; there are also examples where authorities have an agreed overarching strategy (but no SPD) and equally examples where neighbouring authorities approach mitigation in a different way, without a joined up

approach. The advantages of a consistent approach will be clarity for developers and ease of delivery.

3.20 The different schemes provide useful context and some key lessons that are relevant to the Dorset Heaths, in particular:

SAMM

3.21 Most schemes have a clear split between SANG and SAMM with both being integral to the mitigation package. Where there are multiple landowners and organisations involved, then a separate body is often established to deliver the mitigation, for example Bird Aware Solent and the Thames Basin Heaths Partnership and these play a role similar to UHP. In the case of both the Thames Basin Heaths and Bird Aware Solent the ranger team is much larger than Dorset and much more resources have been pushed towards funding the ranger team and raising the profile of their work (for example through social media). The wardening links to SANG provision in that wardens can influence visitor behaviour on the heaths and direct users to other locations – for example encouraging dog walkers who want their dog to be running free to visit a nearby SANG instead.

3.22 The Thames Basin Heaths team is currently around 14 staff[25], covering an area broadly comparable in size to the Dorset Heaths. The Bird Aware Solent team hosts 11 staff that include a ranger team (with a lead ranger, a site specialist (responsible for infrastructure type projects), an outreach specialist, a ranger and an assistant ranger, plus 3 seasonal rangers), alongside a dog initiatives officer (i.e. co-ordinating the dog related projects) and a campaigns and engagement officer who overseas social media and other engagement work.

3.23 The use of behavioural change techniques has been explored by some strategic approaches, with Natural England funding work on the Solent and Thames Basin Heaths (Barker and Park, 2021) and this work has generated a range of guidance and suggestions for best practice.

3.24 Other interesting examples of SAMM measures include measures to address barbeques (e.g. Bradford) through campaign and awareness raising plus provision of dedicated barbeque areas away from the European site. At Cannock Chase the mitigation approach has focussed on changing parking provision, closing some small informal parking locations scattered across the SAC but improving and expanding others. This should make engagement better, making it possible to ensure good signage and interpretation at the right locations and better options for face-face engagement. Visitor use will be more concentrated in the less vulnerable locations.

[25] See the Thames Basin Heaths Partnership website

SANG

3.25 SANGs are widely used in the Thames Basin Heaths in particular, and there are some good examples. Over time the Thames Basin Heaths SANGs have developed into a diverse network of sites that range in size, character and the type of recreation experience they provide. In the Thames Basin Heaths area SANG provision has been at the rate of at least 8ha of new greenspace per 1000 new residents, and where sites with existing use are enhanced as SANG, that existing use is discounted.

3.26 There are now over 70 SANGs in the Thames Basin area[26]. Around 2015 it was recognised it was necessary to promote the sites as a network – i.e. not simply listed on the relevant local authority website – and they are actively promoted. Good examples of SANGs in other parts of the country include the strategic SANG at Dawlish Countryside Park[27] in Teignbridge. This is a SANG for the Exe Estuary SPA and Dawlish Warren SAC and is a large, well promoted site ideally situated to draw access away from the European sites. In general, SANGs have featured less prominently in some of the coastal mitigation schemes, where the coast has a particular draw and SAMM is therefore a key component of mitigation. Cannock Chase is noteworthy as a heathland site with strategic mitigation and (at least at present) no SANG provision, but this site is perhaps relatively unique in the draw the location has being on high ground and as a large single site with provision for mountain biking and other activities which would be hard to deflect.

3.27 Dorset is unique in the approach to HIPs and the wider infrastructure provided alongside SANG. HIPs and small infrastructure projects provide the potential to fill in gaps in provision and link sites. They also provide potential to deliver small elements of mitigation in specific locations that work for small amounts of growth. Through the provision of large SANGs (some strategic), SANGs directly linked to development and other HIPs that are either small in scale or provide for very specific recreation use (e.g. bike parks) the overall SANGs network will be more robust and resilient. The approach of small infrastructure projects as mitigation for small sites is being considered in other areas, particularly those where there are constraints in the availability of large sites that can work as SANG.

Exclusion Zone

3.28 For many of the examples of mitigation schemes the exclusion zone is fundamental to ensuring the mitigation package is effective. European sites, where there are exclusion zones, include heathland and woodland SAC sites, for example the Thames Basin Heaths (400m), Cannock Chase (400m), Ashdown Forest (400m) and Burnham Beeches (500m). Within the zone – as with Dorset - there is a

[26] A list and map are available on the Thames Basin Heaths Partnership website
[27] See relevant page on the Teignbridge District Council website for details

presumption against development, i.e. ensuring no increase in the number of dwellings. The reason for a 400m exclusion zone is that there are particular risks associated with development in such close proximity and furthermore mitigation options are not as effective.

3.29 Where exclusion zones are in place there are limited examples of development coming forward, for example in the Thames Basin Heaths there have been examples of small developments where there is a canal that creates a clear barrier to the site with no crossing points. Such instances are however very rare and reflect exceptional circumstances. The continuation of the exclusion zone in Dorset is likely to be fundamental to future mitigation provision.

Is there any further capacity within the existing SANG network in Dorset?

3.30 The results indicate SANGs are working well to draw visitors. We have used 1 person per ha per hour in previous work as a means to identify sites that are relatively busy – with 1 person per ha per hour representing a level of use higher than much of the Dorset Heaths but well below that expected at a busy urban park. Table 19 gives the visit rates at individual HIPs/SANGs and it can be seen that a number are over 1 person per ha per hour and across all sites combined the visit rate is 1.8 people per ha per hour.

3.31 The data suggest that the following HIPs/SANGs are all above 1 person per ha per hour and therefore there is perhaps unlikely to be further capacity at these locations (further, more detailed assessments and site specific surveys may be beneficial to confirm this):

- Bytheway Field;
- Frenches Farm;
- Granby Road;
- Potterne Park;
- Upton Country Park;
- Riversmeet & Stanpit; and
- Upton Woods.

3.32 Some locations such as Bog Lane, South of Leigh Road East, Canford Park and Woolslope appear to potentially have some capacity (however to some extent the lower visitor rates may simply reflect timing, as it will take some years for HIPs/SANGs to become fully established and working effectively). The data indicate that SANGs use has been increasing and this trend may continue.

3.33 Given that the existing SANGs have been carefully selected and designed as mitigation for existing housing, it is therefore potentially unlikely that they can be relied on to further mitigate for new housing. The existing SANGs should however be used as the basis to consider new mitigation, using the existing SANG and HIP

network as the foundation from which to increase and enhance the network of greenspace and recreation provision.

Future distribution of SANG

3.34 A broad range of different SANGs and HIPs will ensure a robust approach to mitigation, able to cope with changing access patterns and the potential to accommodate a range of access types. The aim should be to create a range of different SANGs with a range of opportunities for recreation away from the heaths, with good geographic spread. Previous studies have indicated that a choice of sites may be important (Liley et al., 2008) and it is through the provision of a range of HIPs and SANGs that resilient, effective and comprehensive mitigation will be achieved.

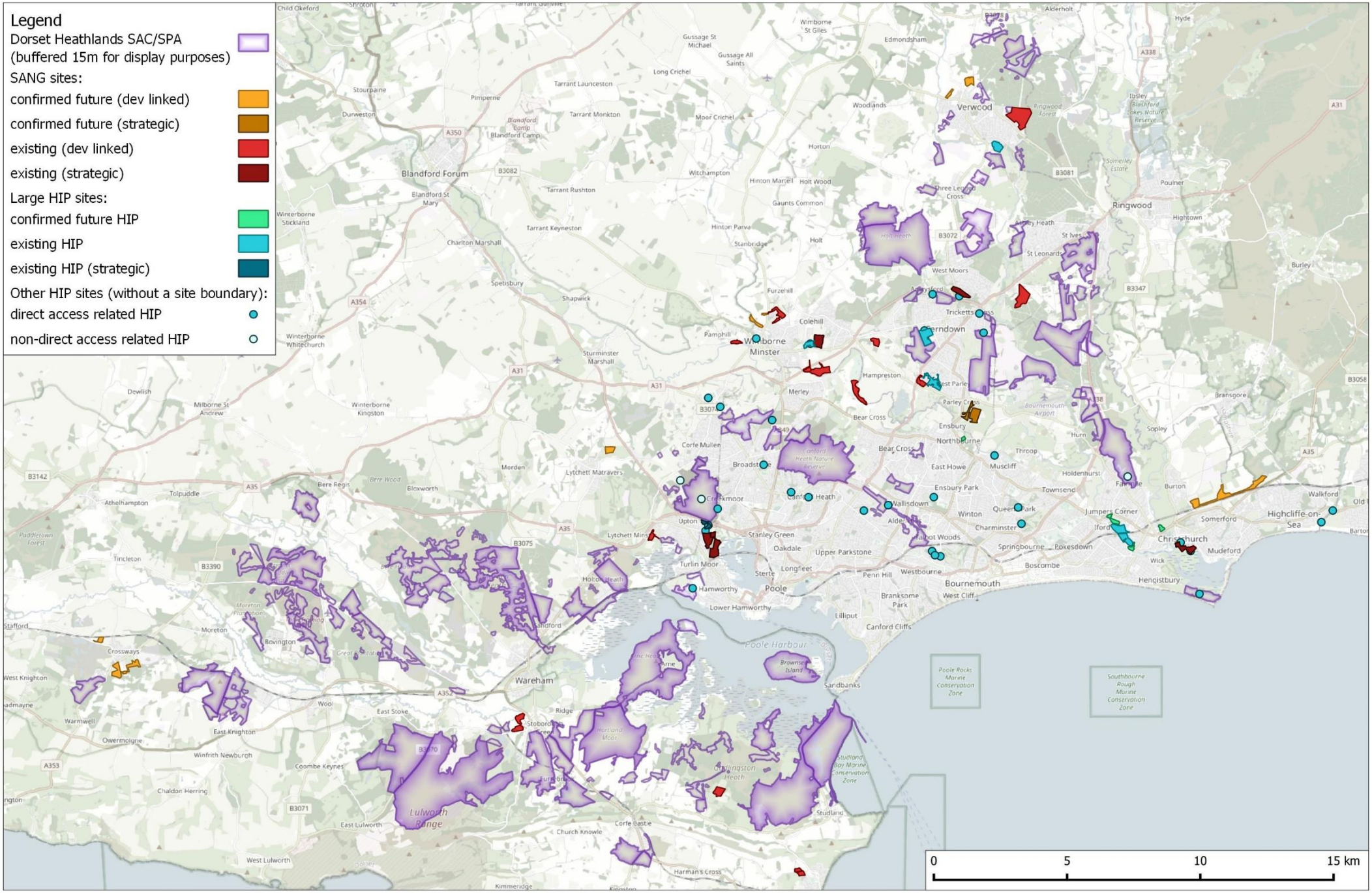
3.35 As of April 2022, a total of 10 discrete SANG sites (115ha) are confirmed for the future (i.e. as mitigation that has yet to be delivered on the ground or open to the public), and these are shown in Map 29[28].

3.36 While clearly future SANG provision needs to be linked to those areas where housing growth comes forward, there are perhaps areas where future SANGs could be targeted to increase the distribution of the network, i.e. ensuring accessible greenspace options across the whole area. Drawing on Map 29 and the spatial analysis of SANG, there has been little or no SANG provision so far towards the north of Purbeck and towards the southern parts of the Bournemouth and Poole conurbation.

3.37 A further gap is around Studland, where there are very limited opportunities given the extensive area that is part of the European site. While a high proportion of visitor use here is tourist and beach focussed (and therefore having little or no impact on the heaths), many do visit to access the heaths or cross the heath to reach the beach, and there is free parking along the length of Ferry Road. A high proportion of visitors access the area from the conurbation using the Ferry. It may be that there are HIP type options that could work to keep visitors on the conurbation side, for example relating to dog access on the beaches, parking provision and charges.

[28] Note that the Map includes Flowers Drove SANG at Lytchett Matravers. This is included because it already has planning permission, but it is linked to allocations in the Purbeck Local Plan Review which do not have permission and require removal from greenbelt to be viable.

Map 29: Distribution of SANG and selected HIP sites.



SANG design and guidelines

3.38 In the Thames Basin Heaths area SANGs delivery is set at a rate of 8ha of new SANG per 1000 new residents, however such a fixed approach has not been applied in Dorset. The figures for the amount of current housing with 5km of the Dorset Heaths (266,392 dwellings) and the area of heathland (8,359ha) provides a useful metric for SANG delivery. This would suggest there is 0.314ha of heathland for each current dwelling. If we assume that the level of SANGs provision broadly aimed to ensure there is no net decrease in accessible countryside per dwelling, then each new dwelling might be expected to provide 0.314ha of SANG – equivalent to 13.07ha per 1000 new residents (assuming an average occupancy of 2.4 people per dwelling).

3.39 SANGs as a network should cater primarily for dog walkers but it is important that they also provide for other activities, including jogging and cycling. Heathland sites such as East Holme, Wareham Forest, Black Hill and Upton Heath are well used for cycling (dirt jumps and mountain bikes) and there are potentially more opportunities for the SANG network to provide for these kinds of activities, alongside the existing mitigation provision in BCP. The SANG network should also be able to provide for organised events and group activities – such as park runs – absorbing pressure that would otherwise be directed towards heaths. Sites could include woodland, grassland and wetlands to provide a range of visitor experiences and opportunities – with for example the potential for shade in the summer, water bodies for dogs to swim in and the appeal of visiting sites with water. A range of sites will be necessary to provide for all these opportunities.

3.40 Large 'destination' sites that provide for a range of long walks, have good parking and potentially a range of visitor facilities to include cafes are likely to provide some of the best alternative sites. The data (see para 2.108) suggest SANGs need to be over 20ha (or perhaps well connected to a wider path network) to provide a route of suitable length that is comparable to the routes walked on the heath. Such sites are potentially best delivered as strategic SANG or associated with large greenfield developments. These could be the priority and focus for SANG delivery.

3.41 Just as the heaths have become better connected to enhance their resilience and reduce the impacts of fragmentation, so there is scope to join and link SANG. The Stour Valley presents excellent potential in this respect. It straddles the boundary between BCP and Dorset Councils and includes SANGs such as Canford Park, Hicks Farm and South of Leigh Road. The connectivity along the river and potential to join up already sizeable greenspaces has potential to provide for a wide range of recreation. Its proximity to a variety of heaths should mean that as the Park improves over time the mitigation it provides will also grow.

3.42 Alongside large single SANGs and projects such as the Stour Valley, there is a role for smaller sites and projects to provide mitigation on a more local level, filling in the gaps (e.g. links to existing greenspace) and providing for local need. The range of smaller HIPs fit within this category and these could be delivered strategically by local authorities or directly linked to development. Such smaller projects are best targeted to locations where low levels of scattered development might occur and where there are no options for large SANGs. Opportunities could include:

- Better links for existing SANGs and greenspaces to path routes and networks around them to ensure that longer routes are possible and provide better opportunities for more active travel to reach SANGs, which is potentially likely to become more important over time.
- Creating the potential for longer cycle routes, to complement the Castleman Trailway, Wareham Forest and routes round Poole Harbour (e.g. through Rempstone);
- Provision of an area or areas that provide for mountain biking and dirt jump use away from sensitive locations;
- Providing dedicated facilities for dog walking or enhancing areas for dog walking, such as allowing dogs off-lead or creating dedicated spaces where dog training or off-lead exercise can take place;
- Upgrading and improving access infrastructure at existing locations that are under-used and where there is scope to draw visitors that would otherwise use the heaths;
- Inclusion of electric vehicle charging at some SANGs and existing greenspaces where more formal parking provision is available to provide a further incentive for people to visit and use them;
- Provision of safe bike parking (e.g. for e-bikes) and ability to lock bikes;
- Use of art, landscaping and good design to maximise the potential for sites to work as multi-functional spaces;
- Better promotion of sites to help direct use and ensure dog walking, cycling and other types of recreation use that potentially conflict can be separated. Such promotion could include signage, engagement with visitors to the heaths, social media/online promotion or through existing community facilities (for example doctor's surgeries, information centres etc.).

3.43 Better promotion of SANGs could take place on the heaths themselves, for example through the promotion of Bog Lane to visitors of the nearby Purbeck NNR. There is also scope for SANGs to provide a range of other functions besides heathland mitigation without compromising their primary role and potentially even enhancing it. For example, there may be opportunities for biodiversity net gain, flood protection, protection of water quality and social benefits such as health and well-being. Ultimately there is the scope for SANGs to be multi-functioning spaces that are celebrated and enjoyed by local residents.

What balance between SANG/HIP and SAMM works best?

3.44 The data show that SANGs appear to be working in drawing good numbers of visitors, yet the numbers of visits to heaths have also continued to increase, at least at some sites. It would therefore seem that both SANG and SAMM are likely to be necessary in the long term to ensure a robust package of mitigation. The heaths are likely to always have a draw and – given the large open areas of habitat and their locations – reliance solely on SANG as mitigation is unrealistic. SANGs clearly do have a role to play in reducing overall pressure and providing a positive alternative to limiting access. A package of measures, designed to better manage access on the heaths, push people to other sites and welcome them on those sites will be necessary.

3.45 We suggest therefore continued SANGs delivery, with options considered to allow for different types of site and opportunities to join with and complement the existing provision. We suggest alongside this, that SAMM provision should be increased, in particular with respect to warden effort. The data (e.g. Figure 4) suggest there is scope for greater warden engagement and that the current level of warden coverage is not sufficient to engage with many of the less regular visitors to the heaths. Fires are a key threat and potential measures to address the increased incidence could include a greater warden presence on the heaths, watching for people with barbeques and watching for fires. In periods of high fire risk there may be scope to temporarily expand the wardening team and to widen coverage to help ensure good cover across the whole of the Dorset Heaths. Other fire-related mitigation would include potentially using volunteer fire wardens, use of drones, vegetation management (reducing the fuel load) and work with retail outlets in relation to the sale of barbeques.

3.46 We suggest that warden effort (across UHP and relevant authority posts) could be targeted following improved data collection (see later in this section). Data from the sensors (e.g. Figure 11) will help identify when warden time could be targeted. We suggest warden effort is logged (see below for details) and with a better understanding of the number of people wardens can speak to and the amount of ground they cover when on site, it should be possible to better identify gaps in coverage. Modelling of engagement should then be able to identify the level of warden coverage and best deployment to maximise the reach and number of people engaged with.

3.47 Alongside warden effort, wider promotion of HIPs/SANGs and continued promotion of Dorset Dogs, ensuring it remains 'live', interesting to new members and active will be important. There is scope to expand Dorset Dogs further and make better use of the growing membership database through targeted messaging around particular issues and sites. Work with local communities and schools will also be important given the increasing area of fires.

The potential for continued mitigation – will it always be possible to mitigate?

3.48 The results presented here paint a complex picture. In a period where the level of housing has increased by 5.7%, visitor numbers to the heaths have perhaps increased by around 10-13%, although this appears to be patchy and there are differences between sites. Bird data, particularly for Nightjar, indicate that the birds are doing ok and increasing at some sites. There is evidence that the SANGs are working well and in general there are many successes in the mitigation approach to report, nonetheless the scale of increase in heath visitors and the increase in the area of fires means there is no scope for complacency.

3.49 The Dorset Heathlands Planning Framework states that mitigation is secured in-perpetuity, which is necessary to ensure compliance with the regulations. Guidance (Tyldesley and Chapman, 2021) is clear that for mitigation to be taken fully into account in HRA, mitigation measures should be effective, reliable, timely, guaranteed to be delivered and as long-term as they need to be to achieve their objectives.

3.50 This means that, for example, warden time and SANG that have been secured as mitigation for a given level of housing growth will need to continue in the long term, and any additional new housing growth will potentially require other solutions or additional SANG and warden time. Theoretically there will be a point where it is impossible to provide more SANG or wardens and therefore the potential for mitigation with the current approach is finite. At present it would seem that there is further capacity, as we have identified that there is potential for additional wardening and there is further potential for HIPs/SANG.

3.51 Monitoring data will play a key role in defining if mitigation is no longer possible. Ultimately, as long as it is possible to keep providing SANG that provides a viable alternative destination for recreation, mitigation is likely to be possible. With respect to wardening time, further data are required and over time there are likely to be diminishing returns from increased warden effort. Besides recreation and urban effects there may be other impacts (such as fragmentation, water quality or water quantity) that limit the levels of growth that are possible without adverse effects on the integrity of European sites.

3.52 The 400m exclusion zone plays a key role in protecting the heaths and dovetails with the SAMM and SANG. By setting development away from the heaths, risks from both urban effects and recreation use are reduced and the zone ensures the effectiveness of mitigation. If options for SAMM and SANG are reduced over time, there could be scope to extend the zone, even in certain areas compared to others. This would ensure growth only came forward in those locations where use could be deflected and where wardens could be targeted appropriately.

What are the future requirements of the monitoring programme?

3.53 Monitoring data are necessary to inform mitigation delivery and ensure delivery is targeted appropriately. Access patterns are not static and recreational use of sites will change over time, with the pandemic and climate change likely to have a marked influence.

3.54 Monitoring therefore needs to be designed to pick up changes and provide a feedback mechanism for conservation staff such that mitigation effort can be targeted. The following data threads provide a framework and have comprised the monitoring to date:

- **Visitor use:**
- Vehicle counts (repeated at set dates through year, all parking locations counted, heaths and SANGs, providing strategic data);
- Sensors (very location specific, providing detailed data on visitor numbers per hour);
- Visitor interviews (surveys on heaths sporadically at selection of locations, SANGs in early years and then regular intervals).
- **Ecological:**
- Breeding birds (sample of 1km squares surveyed annually, same squares surveyed each year).
- Impacts of recreation/urban effects:
- Fire incidence (area burnt, number of fires);
- Other incidents (warden log of incidents, such as motorbikes, livestock worrying etc).
- **Housing change:**
- Postcode data (annual postcode data provides record of residential delivery points).
- **Mitigation delivery:**
- HIP/SANG provision (log of improvements and details of measures implemented);
- Warden effort (record of warden time);
- Log of events run, Dorset Dogs membership, schools visits and social media use.

3.55 It is important that monitoring data are consistent across years and therefore any changes to how data are collected or information recorded should be made with caution. Following the analyses and data presentation here we recommend the following:

- A system to log warden time;
- A focus on ensuring comprehensive vehicle counts;
- A simple vantage point approach to log different activities being undertaken by visitors on the heaths;

- Bird data recorded more systematically in GIS in a standard database with a proforma completed each year to log information on survey completeness, weather effects, timing etc;
- Core sensor selection for long term analysis.

3.56 These are considered in more detail below.

System to log warden time

3.57 There is scope for more detailed logging of warden time, with a system to record the number of people spoken to, incidents resolved and time spent at different locations. This could easily be established with an automatic recording form on phones or tablets which could also log the route taken/area patrolled. This should be done consistently across the warden team. Such data would enable wardening effort to be focussed more efficiently and potentially effectively. At present there is insufficient data to identify how much warden coverage there is per site, how many people are engaged with etc. More detailed data would allow the potential to cross-reference where warden time is spent and where incidents are occurring. Good data on warden time and coverage would enable estimates of how wardening effort might be scaled up and how much scope there is to expand the wardening effort and to what benefit. At the moment it is not possible to accurately assess how comprehensive the current warden provision is (for example coverage during daylight hours, weekends and bank holidays) and how warden hours relate to visitor use (e.g. from sensors). Ideally it would be possible to identify what proportion of visitors might encounter a warden and how that varies across different sites.

Comprehensive vehicle counts

3.58 Vehicle transects provide the best metric of overall visitor use and change in use, as they cover all heaths simultaneously. Given the lack of new housing within 400m, most change in access will relate to those arriving by vehicle. Future monitoring should ensure counts are consistent and achieve good coverage. There are data gaps for sites such as Arne and Studland and counts of these locations are important to include. With measures now implemented to limit roadside parking on some of the Purbeck Heaths, good data will be essential to understand any displacement.

3.59 It is necessary to regularly audit parking locations and ensure an accurate log that reflects any changes to the number of parking spaces, parking charges etc. This has not been undertaken for some time. There will also be changes to parking locations – as new SANGs become operational for example. The parking locations that are counted should therefore be regularly checked and consistently logged to ensure it is possible to compare use easily over time.

3.60 It is also important to recognise that vehicle use may change over time, for example in response to the climate emergency. Electric vehicles may mean people use sites differently and travel patterns change. Electric bikes are becoming more common and may continue to do so. The approach and reliance on vehicle counts as a metric for overall visitor use should therefore be regularly reviewed to ensure they work well and continue to provide a good strategic data set.

3.61 The long-term analysis of the vehicle data could be established to allow trend analysis and for data gaps to be filled. Trends could be plotted for each type of access location and for different geographic areas, and the plots simply updated each year. The data could be set up to allow easy review by site staff and stakeholders and allow car parks with particular changes (e.g. marked increases or decreases) to be picked up over time. This could work in a similar way to the BTO wetland birds alert system that highlights trends in bird numbers and picks out which sites have seen changes that are not reflective of the pattern for the region.

A simple vantage point approach to log different activities being undertaken by visitors on the heaths

3.62 The only data that currently picks up visitor activity types are the interview data, with surveys undertaken sporadically on the heaths. Given the changes associated with Covid and perhaps with climate change there is a need to have a better understanding of the range of activities being undertaken by heath visitors and a better understanding of visitor behaviour. This should be undertaken in a repeatable manner to allow comparison of data over time.

3.63 We therefore recommend a vantage point type approach where an observer remains stationary for a fixed period of time (e.g. 2 hours) and counts/records all recreational activity within a fixed recording area visible from the vantage point. There are numerous locations (such as at Canford, Slepe Heath, Morden Bog, Great Ovens) where it is possible to view a wide area. A small set of locations could be chosen and counts repeated a few times at each (at pre-determined and comparable time windows) through the year. Such counts could be undertaken by UHP staff (or others) but would be best undertaken discretely (e.g. no branded vehicles or obvious hi-vis jacket) to ensure no bias in visitor behaviour linked to the perception of being watched by a warden. The surveys should log the number of different activity types, whether sticking to paths, dogs off lead, whether owners pick-up after dog etc.

3.64 The data could be used to help identify emerging trends/patterns of use and to target warden time and effort.

Bird data

3.65 The approach for bird monitoring was standardised in 2014 with a switch to counting fixed km squares rather than entire sites. This meant it was possible to

collect comparable data from sampling locations across the heaths and survey both large and small sites while avoiding the need to survey thousands of hectares annually. This should mean that effective comparison and trend analysis over time will be easier (from 2014). In order to ensure the data remain comparable and consistent it is necessary to ensure the area surveyed is accurately recorded and any gaps in survey coverage are logged.

Core sensor selection for long term analysis

3.66 The sensor data provide useful information on temporal trends for very specific and discrete locations. At some locations, the information that is most useful is simply how patterns of use vary through the week, e.g. allowing comparison of weekends with weekdays and different times of day. In some cases, it may also be relevant to understand how use varies between seasons, for example whether use levels change markedly during the bird breeding season or high summer. Such data may help inform risks from fire or disturbance. It may also be useful to simply have an indication of the volume of use for a given time window, e.g. to understand whether visitor use has changed following path resurfacing or other local management work.

3.67 The other key use for sensors is to show long term visitor trends and allow a check of how use has changed over an extended period. A set of sensors could be clearly identified for this latter purpose and 'ring-fenced' such that they are not moved and any errors, glitches or technical issues resolved swiftly. This will mean that a set number of sensors provide a long-term data set while others can be moved, relocated and the data accepted as more short term in nature. This will simplify the analysis and ensure outputs are relevant for the intended use.

Suggestions for future mitigation delivery

3.68 Drawing on this section we identify the following key summary points as suggestions for future mitigation delivery:

- Greater cross-over with other mitigation schemes (e.g. adjacent European sites), potentially to ensure cost savings in mitigation delivery and potential for measures to apply across multiple sites (e.g. the Dorset Heaths, New Forest, Poole Harbour);
- Continued and expanded collaboration between heathland areas in different parts of the country to share experience of mitigation approaches and best practice;
- Flexibility in the use of mitigation funds to respond to emerging issues/trends and exploit opportunities (such as other funding streams) as available;
- Increased warden provision with more warden time patrolling sites and extending reach of warden team to more rural sites as appropriate, targeted using monitoring data;
- Increased use of behavioural change techniques, marketing and branding to influence visitor behaviour (dog on leads a particular focus);

- Expansion of Dorset Dogs with more targeted messaging and campaigning relating to specific sites or issues and extending the reach beyond the existing membership;
- Increased targeting of funds towards parking management around the heaths, especially in areas where there are lots of small, scattered parking locations or roadside parking (e.g. some of the Purbeck heaths, Wareham Forest, Holt Heath);
- Wider communication around barbeques and campfires, building and continuing the existing campaign and potentially working with charcoal retailers, shops and other outlets;
- Additional vegetation management to reduce fuel load and fire risk;
- Greater role for HIPs and small-scale infrastructure to improve green infrastructure to join existing SANG and connect greenspaces, providing for more variation in recreation experience;
- Further large SANGs of at least 20ha (and ideally much more) to provide a range of routes and destinations, potentially able to cope with different activities and types of access;
- Creating the potential for more longer cycle routes in and around SANGs;
- Provision of an area or areas that provide for mountain biking and dirt jump use away from sensitive locations;
- Creation of path links, new parking and wider path network around existing SANGs, providing better links and connectivity;
- Inclusion of electric vehicle charging at some SANG locations where more formal parking provision available;
- Provision of safe bike parking (e.g. ebikes) and ability to lock bikes (relevant to both the SANGs and heaths) and charge them;
- Use of art, landscaping and good design to maximise the potential for SANG and GI to work as inspiring, celebrated multi-functional spaces;
- Better promotion of HIP/SANG sites to help direct use and ensure dog walking, cycling and other types of recreation use that potentially conflict can be separated, with promotion expanded through health centres, local community resources etc;
- A system to log and map warden time and effort;
- Continuation of existing monitoring threads, ensuring in particular that vehicle counts are comprehensive and a core set of sensors are ‘ring fenced’ to provide long term trend data;
- Bird data recorded more systematically in GIS to ensure survey coverage accurately reflected.
- Additional monitoring data utilising a simple vantage point approach to log different activities being undertaken by visitors on the heaths.

References

Allinson, E., 2018. The role of suitable alternative natural greenspace in protecting high value wildlife sites (PhD). Southampton.

Barker, J., Park, T., 2021. Using Behavioural Insights to Reduce Recreation Impacts on Wildlife: Guidance and Case Studies from Thames Basin Heath and the Solent (Natural England Commissioned Report No. 329). Behvioural Insights Team for Natural England.

Burger, J., Leonard, J., 2000. Conflict resolution in coastal waters: the case of personal watercraft. Mar. Policy 24, 61–67. https://doi.org/10.1016/S0308-597X(99)00013-5

Burnett, H., Olsen, J.R., Nicholls, N., Mitchell, R., 2021. Change in time spent visiting and experiences of green space following restrictions on movement during the COVID-19 pandemic: a nationally representative cross-sectional study of UK adults. BMJ Open 11, e044067. https://doi.org/10.1136/bmjopen-2020-044067

Byfield, A., Cox, J., Pearman, D., 1995. A future for Dorset's heathland flora.

Catchpole, C.K., Phillips, J.F., 1992. Territory quality and reproductive success in the Dartford Warbler Sylvia undata in Dorset, England. Biol. Conserv. 61, 209–215.

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

Coombes, E.G., Jones, A.P., 2010. Assessing the impact of climate change on visitor behaviour and habitat use at the coast: A UK case study. Glob. Environ. Change 20, 303–313. https://doi.org/10.1016/j.gloenvcha.2009.12.004

De Molinaar, H.J.G., 1998. On-the-spot appraisal of the Dorset heathland, UK. Report and recommendations to the standing committee on The Convention on the Conservation of European Wildlife and Natural Habitats. Council of Europe., Strasbourg:

Dorset Council, BCP Council, 2020. The Dorset Heathlands Planning Framework 2020-2025 Supplementary Planning Document.

Haskins, L., 2000. Heathlands in an urban setting - effects of urban development on heathlands of south-east Dorset. Br. Wildl. 11, 229–237.

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

Liley, D., Clarke, R.T., 2003. The impact of urban development and human disturbance on the numbers of nightjar Caprimulgus europaeus on heathlands in Dorset, England. Biol. Conserv. 114, 219–230.

Liley, D., Clarke, R.T., 2002. Urban development adjacent to heathland sites in Dorset: the effect on the density and settlement patterns of Annex 1 bird species. English Nature, Peterbrough.

Liley, D., Clarke, R.T., Mallord, J.W., Bullock, J.M., 2006. The effect of urban development and human disturbance on the distribution and abundance of nightjars on the Thames Basin and Dorset Heaths. Natural England/Footprint Ecology.

Liley, D., Clarke, R.T., Underhill-Day, J., Tyldesley, D.T., 2007. Evidence to support the Appropriate Assessment of development plans and projects in south-east Dorset. Footprint Ecology / Dorset County Council.

Liley, D., Fearnley, H., 2014. Trends in Nightjar, Woodlark and Dartford Warbler on the Dorset Heaths 1991-2013. Footprint Ecology / Birds of Poole Harbour.

Liley, D., Sharp, J., Clarke, R.T., 2008. Access patterns in south-east Dorset. Dorset household survey and predictions of visitor use of potential greenspace sites. Dorset Heathlands Development Plan Document. Footprint Ecology / Poole Borough Council.

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

Mallord, J., Dolman, P., Brown, A., Sutherland, W., 2007. Linking recreational disturbance to population size in a ground-nesting passerine. J. Appl. Ecol. 44, 185–195. https://doi.org/doi:10.1111/j.1365-2664.2006.01242.x

McEvoy, D., Cavan, G., Handley, J., McMorrow, J., Lindley, S., 2008. Changes to Climate and Visitor Behaviour: Implications for Vulnerable Landscapes in the North West Region of England. J. Sustain. Tour. 16, 101. https://doi.org/10.2167/jost676.0

Medeiros, R., Ramosa, J.A., Paivaa, V.H., Almeidac, A., Pedroa, P., Antunes, S., 2007. Signage reduces the impact of human disturbance on little tern nesting success in Portugal. Biol. Conserv. 135, 99–106.

Moore, N.W., 1962. The heaths of Dorset and their conservation. J. Ecol. 60, 369–91.

Morgan, L., Protopopova, A., Birkler, R.I.D., Itin-Shwartz, B., Sutton, G.A., Gamliel, A., Yakobson, B., Raz, T., 2020. Human–dog relationships during the COVID-19 pandemic: booming dog adoption during social isolation. Humanit. Soc. Sci. Commun. 7, 1–11. https://doi.org/10.1057/s41599-020-00649-x

Murison, G., 2007. The impact of human disturbance, urbanisation and habitat type on a Dartford warbler Sylvia undata population. University of East Anglia, School of Biological Sciences, Norwich.

Murison, G., 2002. The impact of human disturbance on the breeding success of nightjar Caprimulgus europaeus on heathlands in south Dorset, England. English Nature, Peterborough.

Murison, G., Bullock, J.M., Underhill-Day, J., Langston, R., Brown, A.F., Sutherland, W.J., 2007. Habitat type determines the effects of disturbance on the breeding productivity of the Dartford Warbler Sylvia undata. Ibis 149, 16–26. https://doi.org/doi:10.1111/j.1474-919X.2007.00660.x

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

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

Panter, C., Caals, Z., 2020a. Dorset Heaths 2019 Visitor Survey (Unpub. Report No. 545). Urban Heaths Partnership.

Panter, C., Caals, Z., 2020b. Urban Heaths Partnership Annual Monitoring Report 2018-19. Unpublished report for the Urban Heaths Partnership.

Panter, C., Caals, Z., 2020c. Riversmeet and Stanpit SANG Visitor Surveys (Unpublished Report No. 573). Footprint Ecology / Dorset Council.

Panter, C., Liley, D., 2019. Visitor surveys at Cranemoor and Chewton Common, Christchurch (Unpub. No. 503). Footprint Ecology / Meyrick Trust.

Randler, C., Tryjanowski, P., Jokimäki, J., Kaisanlahti-Jokimäki, M.-L., Staller, N., 2020. SARS-CoV2 (COVID-19) Pandemic Lockdown Influences Nature-Based Recreational Activity: The Case of Birders. Int. J. Environ. Res. Public. Health 17, 7310. https://doi.org/10.3390/ijerph17197310

Rose, R.J., Webb, N.R., Clarke, R.T., Traynor, C.H., 2000. Changes on the heathlands in Dorset, England, between 1987 and 1996. Biol. Conserv. 93, 117–125.

Schiemann, J., 1991. The Extent of the Legal Protection enjoyed by Sites of Special Scientific Interest in England and Wales. J. Environ. Law 3, 293–309. https://doi.org/10.1093/jel/3.2.293

Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Noble, D., Douse, A., Lindley, P., McCulloch, N., Win, I., 2021. The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. Br. Birds 114, 723–747.

Tyldesley, D., Chapman, C., 2021. The Habitats Regulations Handbook. DTA Publications.

Webb, N.R., 1990. Changes in the heathlands of Dorset, England, between 1978 and 1987. Biol. Conserv. 51, 273–286.

Webb, N.R., 1980. The Dorset Heathlands, present status and conservation. Bull. Ecol. 11, 659–664.

Webb, N.R., Haskins, L.E., 1980. An ecological survey of heathlands in the Poole Basin, Dorset, England, in 1978. Biol. Conserv. 17, 281–296.

Webb, N.R., Vermaat, A.H., 1990. Changes in vegetational diversity on remnant heathland fragments. Biol. Conserv. 53, 253–264. https://doi.org/doi:10.1016/0006-3207(90)90096-8

Williams, D.R., Child, M.F., Dicks, L.V., Okendon, N., Pople, R.G., Showler, D.A., Walsh, J.C., zu Ermgassen, E., Sutherland, W.J., 2017. Bird Conservation, in: Sutherland, W.J., Dicks, L.V., Okendon, N., Smith, R.K. (Eds.), What Works in Conservation 2017. Open Book Publishers, Cambridge.

Appendix 1: Qualifying features of the Dorset Heaths European Sites

Links in the table cross-reference to the Natural England website and the relevant page with the site's conservation objectives. In the qualifying features column, for SPAs NB denotes non-breeding and B breeding features. For SACs, # denotes features for which the UK has a special responsibility. The descriptive text is adapted from Natural England's site improvement plan (and we have omitted descriptions for the Ramsar sites as in all cases the site overlaps with an SAC/SPA). For Ramsar sites, the qualifying features and description are drawn from the Ramsar spreadsheet on the JNCC website[29], and the link cross-references to the Ramsar site information page.

European site	Qualifying features
Dorset Heaths SAC	H4030 European dry heaths H7230 Alkaline fens H6410 Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) H4010 Northern Atlantic wet heaths with *Erica tetralix* H7150 Depressions on peat substrates of the Rhynchosporion H7210# Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* H9190 Old acidophilous oak woods with *Quercus robur* on sandy plains S1044 *Coenagrion mercuriale*: Southern damselfly S1166 *Triturus cristatus*: Great crested newt
Dorset Heaths (Purbeck & Wareham) & Studland Dunes SAC	H4030 European dry heaths H2150# Atlantic decalcified fixed dunes (*Calluno-Ulicetea*) H7230 Alkaline fens H2110 Embryonic shifting dunes H2190 Humid dune slacks H6410 Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) H4010 Northern Atlantic wet heaths with *Erica tetralix* H2120 Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes") H3110 Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) H7150 Depressions on peat substrates of the Rhynchosporion H4020# Temperate Atlantic wet heaths with *Erica ciliaris* and *Erica tetralix* H7210# Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* H9190 Old acidophilous oak woods with *Quercus robur* on sandy plains H91D0# Bog woodland S1044 *Coenagrion mercuriale*: Southern damselfly S1166 *Triturus cristatus*: Great crested newt

[29] http://archive.jncc.gov.uk/default.aspx?page=2392

European site	Qualifying features
Dorset Heathlands SPA	A224(B) *Caprimulgus europaeus*: European Nightjar A246(B) *Lullula arborea*: Woodlark A302(B) *Sylvia undata*: Dartford Warbler A082(NB) *Circus cyaneus*: Hen Harrier A098(NB) *Falco columbarius*: Merlin
Dorset Heathlands Ramsar	Criterion 1: Contains particularly good examples of (i) northern Atlantic wet heaths with cross-leaved heath *Erica tetralix* and (ii) acid mire with *Rhynchosporion*. Contains largest example in Britain of southern Atlantic wet heaths with Dorset heath *Erica ciliaris* and cross-leaved heath *Erica tetralix*. Criterion 2: Supports 1 nationally rare and 13 nationally scarce wetland plant species, and at least 28 nationally rare wetland invertebrate species. Criterion 3: Has a high species richness and high ecological diversity of wetland habitat types and transitions, and lies in one of the most biologically-rich wetland areas of lowland Britain, being continuous with three other Ramsar sites: Poole Harbour, Avon Valley and The New Forest.

Appendix 2: Key milestones (publications and interventions) relating to the Dorset Heaths and urban impacts

1962 Classic study by N. Moore highlights the fragmentation and direct loss of heathland (Moore, 1962).

1980 The first heathland survey of Dorset takes place and highlights fragmentation (Webb, 1990, 1980; Webb and Haskins, 1980; Webb and Vermaat, 1990).

1989 Borough of Poole grants itself permission to build on part of Canford Heath in 1989, following failure of the Secretary of State to call in a planning application following appeal by the then NCC. This is the last development on a heathland SSSI in Dorset (see Schiemann, 1991).

1995 Comparison of old flora records with present day highlights impacts from lack of grazing and cessation of traditional management practices (Byfield et al., 1995).

1997 Heritage Lottery Fund project "Hardy's Egdon Heath - return of the native Dorset heathland" within the National programme called "Tomorrow's Heathland Heritage"

1998 On-the-spot appraisal of The Dorset Heaths by the Council of Europe under The Bern Convention: DeMolinaar report to the Council of Europe highlights the urban impacts on the Dorset Heaths (De Molinaar, 1998).

1999 Review of heath fires highlights that incidence of heath fires is related to housing, with more fires on urban heaths (Kirby and Tantram, 1999).

2000 Paper in British Wildlife provides a review of urban effects on the Dorset Heaths (Haskins, 2000).

2001 Development at Holton Heath, involving 1350 houses, rejected at public inquiry in 2001 due to urban impacts on adjacent heathland. Refusal results in Purbeck Plan being thrown out.

The Urban Heath LIFE project was established following in 2001 an award of £1.2 million by the EU LIFE to help combat urban pressures on the Heaths

2002 Analysis showing number of nightjars on heathland sites is negatively related to the number of houses surrounding each site (Liley and Clarke, 2003, 2002).

Nightjar fieldwork shows breeding success lower on urban sites and close to footpaths (Murison, 2002).

2005 First systematic visitor survey across the Dorset Heaths is undertaken in 2005 (Clarke et al., 2006).

Review of urban effects on heathlands commissioned by English Nature (Underhill-Day 2005).

Woodlark PhD demonstrates that consequence of disturbance for woodlarks on the Dorset heaths (Mallord 2005; Mallord et al. 2006)

2006 Models of visitor distribution within heaths used to explore nightjar distributions within heaths. Shows that nightjar territories located in areas with lower visitor numbers (Liley et al., 2006).

Interim Planning Framework (IPF) established 2006, setting a development exclusion zone for new housing at 400m from the heaths and developer contributions (for new development 400m-5km from the heaths) used to fund mitigation measures. Various initiatives implemented around the heaths, including warden team (Urban Heaths Partnership) and new green infrastructure.

2007 Evidence report commissioned to inform appropriate assessment, includes modelling of future visitor numbers on the Dorset Heaths. Analysis shows that visitor numbers on heaths is linked to the number of houses around heaths (Liley et al., 2007).

PhD study on Dartford warblers highlights high incidence of cat predation and reduced breeding success as a result of disturbance (Murison, 2007).

2012 Dorset Heaths Planning Framework joint Supplementary Planning Document (SPD) replaces the IPF in 2012. Adopted by 5 different local planning authorities this set out a joint approach to mitigation.

2013 BytheWay, near Wimborne, is the first SANG (Suitable Alternative Greenspace) in Dorset, providing an alternative destination for recreation away from the heaths.

2015 Upton Country Park extended in 2015, with funding from developer contributions, to provide strategic Suitable Alternative Natural Greenspace (SANG) to deflect people from the heaths.

2016 Joint SPD updated in 2016: the Dorset Heathlands Planning Framework 2015-2020.

2017 – Back from the Brink Dorset Heathland Heart – a multi-partner four-year National Heritage Lottery Fund cross-taxa species recovery project across the Dorset Heaths commences

2019 Merging of local planning authorities means that Dorset Heaths fall within 2 local authorities: BCP and Dorset Councils.

2020 Joint SPD updated in 2020: the Dorset Heathlands Planning Framework 2020-2025.

Major fire in Wareham Forest of 220ha.

Appendix 3: Sensor database

This appendix contains an additional table and figure to outline the sensor database by each sensor.

Table 26: Summary table of all sensors.

Sensor ID	Site name	Sensor type	First day of data	Last day of data	Years of data (first – last)	days of cleaned data	Site type
ADH1	Dunyeats	LR pyro	23/06/2016	28/11/2019	3.4	1156	Heathland
BHH1	Hengistbury Head	slab	16/06/2008	10/05/2016	7.9	2624	Heathland& Other/Visitor attractions
BHH2	Hengistbury Head	LR pyro	07/08/2009	02/01/2014	4.4	1480	Heathland& Other/Visitor attractions
BHH3	Hengistbury Head	LR pyro	07/08/2009	09/09/2015	6.1	1947	Heathland& Other/Visitor attractions
BKC1	Kinson Common	slab	28/10/2008	20/10/2009	1	356	Other
BMM1	Millhams Mead	LR pyro	10/02/2010	17/02/2010	0	6	Other
BMM2	Millhams Mead	slab	10/02/2010	25/09/2012	2.6	824	Other
BMP1	Meyrick Park	slab	12/02/2009	23/06/2020	11.4	3923	HIP& Other
BMP2	Meyrick Park	slab	14/08/2009	19/05/2011	1.8	640	HIP& Other
BPH1	Pugs Hole	slab	12/02/2009	23/06/2020	11.4	3484	HIP& Other
BSV1	Stour Valley	LR pyro	26/01/2015	28/06/2018	3.4	118	HIP
BSV2	Stour Valley	LR pyro	26/01/2015	16/06/2017	2.4	456	HIP
BSV2a	Stour Valley	LR pyro	20/06/2018	06/08/2020	2.1	747	HIP
BSV3	Stour Valley	LR pyro	26/01/2015	06/08/2020	5.5	1429	HIP
BSV4	Stour Valley	LR pyro	27/01/2015	06/02/2019	4	673	HIP
BTC1	Turbary Common	slab	27/10/2008	21/03/2020	11.4	3790	Heathland
CABMX1	Arena Stoney Lane	slab (large)	18/12/2007	16/02/2009	1.2	424	HIP
CABMX2	Arena Stoney Lane	slab (large)	18/12/2007	14/10/2011	3.8	1260	HIP
CB1	Bargates	LR pyro	31/07/2018	24/04/2019	0.7	1	HIP
CBCCG1	Chewton Gateway	slab (large)	13/11/2009	23/06/2011	1.6	462	Other
CCB1	Chewton Bunny	slab	15/03/2009	23/06/2011	2.3	308	HIP
CCB1A	Chewton Bunny	slab	26/01/2011	16/04/2017	6.2	1517	HIP
CNM1	Nea meadows	LR pyro	08/08/2018	12/05/2020	1.8	16	HIP
CRM1	2 riversmeet SANG	LR pyro	20/03/2019	11/03/2020	1	328	SANG
CSCH1	St Catherines Hill	slab	01/04/2008	16/05/2019	11.1	3927	Heathland
CSCH2	St Catherines Hill	slab	04/06/2008	17/01/2011	2.6	726	Heathland
CSP1	Stanpit	slab	21/05/2012	12/05/2020	8	2396	HIP
CSS1	South Shore	slab	19/10/2011	30/10/2012	1	336	Other
DAH1	Avon Heath	slab	24/06/2008	01/04/2011	2.8	906	Heathland
DAH10	Avon Heath	LR pyro	05/04/2018	03/11/2019	1.6	222	Heathland

Sensor ID	Site name	Sensor type	First day of data	Last day of data	Years of data (first – last)	days of cleaned data	Site type
DAH11	Avon Heath Country Park Birch Rd	slab	10/10/2018	07/06/2020	1.7	412	Heathland
DAH1A	Avon Heath Country Park Birch Rd	slab	03/02/2011	28/11/2019	8.8	3026	Heathland
DAH2	Avon Heath Country Park	slab	31/03/2009	28/07/2020	11.3	3833	Heathland
DAH3	Avon Heath Country Park Boundary Lane	slab	17/09/2008	10/08/2010	1.9	599	Heathland
DAH3A	Avon Heath Country Park Boundary Lane	slab	08/11/2010	14/11/2017	7	2144	Heathland
DAH4	Avon Heath Country Park	LR pyro	28/05/2009	22/05/2020	11	3170	Heathland
DAH5	Avon Heath CP	LR pyro	30/04/2012	06/04/2013	0.9	290	Heathland
DAH6	Avon Heath CP block	LR pyro	04/02/2015	31/07/2020	5.5	1693	Heathland& Other/Visitor attractions
DAH7	Avon Heath CP car	LR pyro	04/02/2015	04/10/2018	3.7	1321	Heathland& Other/Visitor attractions
DAH8	Avon heath CP - playpark	LR pyro	22/12/2016	04/10/2018	1.8	642	Visitor attractions
DAH9	Avon heath CP - visitor centre	break beam internal	22/12/2016	30/07/2020	3.6	1007	Heathland& Other/Visitor attractions
DCTW1SH	Castleman Trailway Stapehill	LR pyro	21/10/2008	23/06/2009	0.7	243	Other
DCTWHRX1	Castleman Trailway Horton Rd	bikes inductive loop	24/10/2008	25/05/2017	8.6	2666	Other
DCTWHRX2	Castleman Trailway Horton Rd	pyro	04/06/2012	20/11/2017	5.5	1389	Other
DCTWHRX3	Castleman Trailway Horton Rd	pyro horse	31/03/2009	18/03/2012	3	1027	Other
DCTWLHX1	Castleman Trailway Lions Hill Farm Crossing	acoustic	24/10/2008	03/02/2011	2.3	144	Other
DCTWLHX2	Castleman Trailway Lions Hill Farm Crossing	LR pyro	31/03/2009	26/04/2014	5.1	1727	Other
DCTWLHX3	Castleman Trailway Lions Hill Farm Crossing	LR pyro	31/03/2009	26/04/2014	5.1	1336	Other
DCV1	Purbeck ridge	pyro	04/11/2010	29/06/2011	0.6	165	-
DLH1CTW	Castleman Trailway/Lions Hill (central)	slab	25/06/2008	31/07/2020	12.1	4004	Heathland
DS1	Steeple - near Creech Viewpoint	pyro	13/02/2009	18/05/2009	0.3	78	Other
DSB1	Slop Bog (Grazing Unit)	pyro	31/03/2009	22/06/2009	0.2	82	Heathland
DSB1A	Slop Bog (Grazing Unit)	slab	25/08/2010	21/07/2020	9.9	2900	Heathland
DSB2	Slop Bog (Redwood Drive)	slab	31/03/2009	23/04/2019	10.1	3270	Heathland

Sensor ID	Site name	Sensor type	First day of data	Last day of data	Years of data (first – last)	days of cleaned data	Site type
DTWHRX 2A	Castleman Trailway Horton Rd	LR pyro	23/11/2010	17/04/2013	2.4	782	Other
DUH1	Upton Heath	pyro	12/03/2009	07/04/2020	11.1	3131	Heathland
DUH2	Upton Heath	pyro	06/04/2009	04/06/2018	9.2	2807	Heathland
EMVBR1 3	Moors Valley CP	pyro	11/08/2010	24/03/2019	8.6	2774	Other
EMVPP	Moors Valley CP	pyro	11/08/2010	01/09/2011	1.1	335	Other
EMVPPA	Moors Valley CP	LR pyro	14/12/2013	15/09/2017	3.8	1230	HIP
EPC1	Poor Common	LR pyro	10/10/2018	21/07/2020	1.8	623	HIP
EWS1	Woolslope	LR pyro	10/10/2018	23/04/2019	0.5	194	SANG
HDH1	Dunyeats Hill	pyro	22/08/2007	21/10/2007	0.2	59	Heathland
HDH1A	Dunyeats Hill	slab	29/07/2009	14/04/2016	6.7	1169	Heathland
HFC1	Ferndown Common	slab	12/03/2008	09/04/2011	3.1	939	Heathland
HFC2	Ferndown Common	slab	12/03/2008	12/11/2009	1.7	603	Heathland
HFC2A	Ferndown Common	pyro	30/01/2011	02/09/2019	8.6	2189	Heathland
HFC3	Ferndown Common	slab	07/03/2008	20/11/2017	9.7	3325	Heathland
HFC4	Ferndown Common	LR pyro	12/03/2008	09/04/2017	9.1	3294	Heathland
HFC5	Ferndown Common	slab	12/03/2008	25/06/2020	12.3	3505	Heathland
HGO1	Great Ovens	slab	16/03/2008	14/05/2020	12.2	3707	Heathland
HGO2	Great Ovens	pyro	22/07/2008	16/09/2017	9.2	3197	Heathland
HL1	Lytchetts	pyro	06/03/2008	26/06/2015	7.3	2590	Heathland
HL1A	Lytchett	pyro	26/07/2016	19/05/2020	3.8	1383	Heathland
HPC1	Parley Common	slab	07/03/2008	15/05/2017	9.2	2665	Heathland
HPC1a	Parley	slab	23/11/2017	05/07/2020	2.6	107	Heathland
HPC2	Parley Common	pyro	12/03/2008	06/11/2010	2.7	845	Heathland
HPC2A	Parley Common	slab	21/11/2010	24/10/2013	2.9	813	Heathland
HPC3	Parley Common	slab	07/03/2008	07/10/2011	3.6	1167	Heathland
HPC3A	Parley Common	slab	06/01/2012	19/11/2017	5.9	1881	Heathland
HPC4	Parley Common	slab	07/03/2008	05/07/2011	3.3	1199	Heathland
HTC1	Town Common	slab	14/03/2008	12/05/2020	12.2	3985	Heathland
HTC2	Town Common	pyro	14/03/2008	04/11/2008	0.6	233	Heathland
NSH1	Stoborough Heath	slab	08/09/2009	29/01/2016	6.4	1809	HIP(& heathland)
NSH2	Stoborough Heath	slab	08/09/2009	06/11/2013	4.2	1503	HIP(& heathland)
NSH3	Stoborough Heath	slab	08/09/2009	25/02/2015	5.5	1755	HIP(& heathland)
NSH4	Stoborough Heath	slab	08/09/2009	16/12/2015	6.3	2186	HIP(& heathland)
NSH5	Stoborough Heath	pyro	08/09/2009	29/04/2017	7.6	1897	Heathland
NSH6	Stoborough Heath	LR pyro	08/10/2009	14/10/2014	5	1296	HIP(& heathland)
PBH1	Broadstone Heath	slab	12/10/2011	05/01/2016	4.2	952	HIP
PBL1	Bog Lane	LR pyro	22/06/2017	14/05/2020	2.9	1049	SANG
PBL2	Bog Lane	LR pyro	18/05/2018	16/06/2019	1.1	348	SANG

Sensor ID	Site name	Sensor type	First day of data	Last day of data	Years of data (first – last)	days of cleaned data	Site type
PBV1	Bourne Valley	slab	22/07/2009	11/07/2012	3	578	Heathland
PBV2	Bourne Valley	slab	19/08/2009	06/08/2020	11	3670	Heathland
PBV3	Bourne Valley	slab	12/04/2011	26/03/2017	6	2161	HIP(& heathland)
PCA1	Canford Heath	pyro	28/01/2008	09/06/2020	12.4	3525	Heathland
PCA2	Canford Heath	slab (large)	25/09/2008	03/01/2013	4.3	1265	Heathland
PCA3	Canford Heath	slab (large)	04/02/2008	06/02/2013	5	1680	Heathland
PCA4	Canford Heath	slab (large)	09/09/2009	09/06/2020	10.8	3323	Heathland
PCA5	Canford Heath	pyro	02/09/2009	09/10/2018	9.1	2803	Heathland
PCA6	Canford Heath	pyro	29/09/2008	15/12/2008	0.2	76	Heathland
PCA6A	Canford Heath	LR pyro	29/07/2009	10/10/2017	8.2	2830	Heathland
PCA7	Canford Heath	slab (large)	13/05/2008	11/02/2010	1.8	526	Heathland
PCA7A	Canford Heath	slab (large)	23/01/2011	31/07/2014	3.5	1158	Heathland
PCH1	Corfe Hills West	slab	14/03/2008	06/03/2011	3	905	Heathland
PCS1	Canford Park SANG	LR pyro	17/04/2019	09/06/2020	1.1	413	SANG
PDW1	Delph Woods	slab	04/11/2010	24/03/2020	9.4	3259	HIP
PHB1	Haymoor Bottom	slab	02/06/2009	27/09/2012	3.3	761	Other
PHC1	Ham Common	slab large	13/08/2009	24/06/2019	9.9	2762	Heathland& Other
PHC3	Ham Common	pyro	18/05/2009	19/05/2020	11	3210	Heathland
PHC4	Ham Common	pyro	14/10/2008	06/04/2018	9.5	3062	Heathland
PHC5	Ham Common	slab	15/10/2008	19/05/2020	11.6	4075	Heathland
PHO1	Holes Bay	LR pyro	08/04/2009	17/03/2020	10.9	3224	HIP
PLW1	Upton Heath Longmeadow Lane	slab	12/03/2009	19/05/2020	11.2	4025	Heathland
PTH1	Talbot Heath	slab	25/09/2008	13/05/2014	5.6	1280	Heathland
PTH2	Talbot Heath	pyro	01/07/2009	16/07/2015	6	1824	Heathland& Other
PTH3	Talbot Heath	pyro	01/07/2009	06/08/2020	11.1	3949	Heathland
PTH4	Talbot Heath	slab	12/03/2009	10/01/2013	3.8	1388	Heathland
PTH5	Talbot Heath	pyro	12/03/2009	06/03/2018	9	2573	Heathland
PTH6	Talbot Heath	pyro	12/03/2009	23/06/2020	11.3	4097	Heathland
PUP1	Upton Country Park	pyro	08/04/2009	07/08/2020	11.3	3487	Visitor Attractions
PUP2	Upton Country Park	LR pyro	04/08/2008	01/08/2014	6	1907	Visitor Attractions
PUP3	Upton Country Park	pyro	04/08/2008	20/10/2015	7.2	2458	Visitor Attractions
PUP3A	Upton Country Park	LR pyro	31/08/2018	12/04/2019	0.6	212	Visitor Attractions
PUS1	UCP SANG (woods)	LR pyro	05/08/2015	04/08/2020	5	1118	SANG
PUS2	UCP SANG (pony d)	LR pyro	05/08/2015	07/08/2020	5	1623	SANG
PUS3	Upton Country Park	LR pyro	22/02/2018	07/08/2020	2.5	852	SANG
PUS4	Upton Country Park	LR pyro	22/02/2018	07/08/2020	2.5	859	SANG

Sensor ID	Site name	Sensor type	First day of data	Last day of data	Years of data (first – last)	days of cleaned data	Site type
PUS5	Upton Country Park	LR pyro	26/02/2018	07/08/2020	2.4	846	SANG
PUS6	Upton Country Park	LR pyro	26/02/2018	31/07/2020	2.4	855	SANG
PUS7	Upton Country Park	LR pyro	26/02/2018	05/08/2020	2.4	774	SANG
PUS8	Upton Country Park	LR pyro	26/02/2018	07/08/2020	2.4	762	Visitor Attractions
RB1	Burnbake Campsite SANG	LR pyro	01/06/2015	07/08/2018	3.2	698	SANG
WTH1	Tadnoll Heath	LR pyro	21/01/2014	16/04/2018	4.2	1531	Heathland
WUH1	Upton Heath	slab	10/12/2007	19/05/2020	12.4	4269	Heathland
WWH1	Winfrith Heath	LR pyro	21/01/2014	14/05/2020	6.3	1853	Heathland
WWH2	Winfrith Heath	slab	21/01/2014	14/03/2018	4.1	1152	Heathland

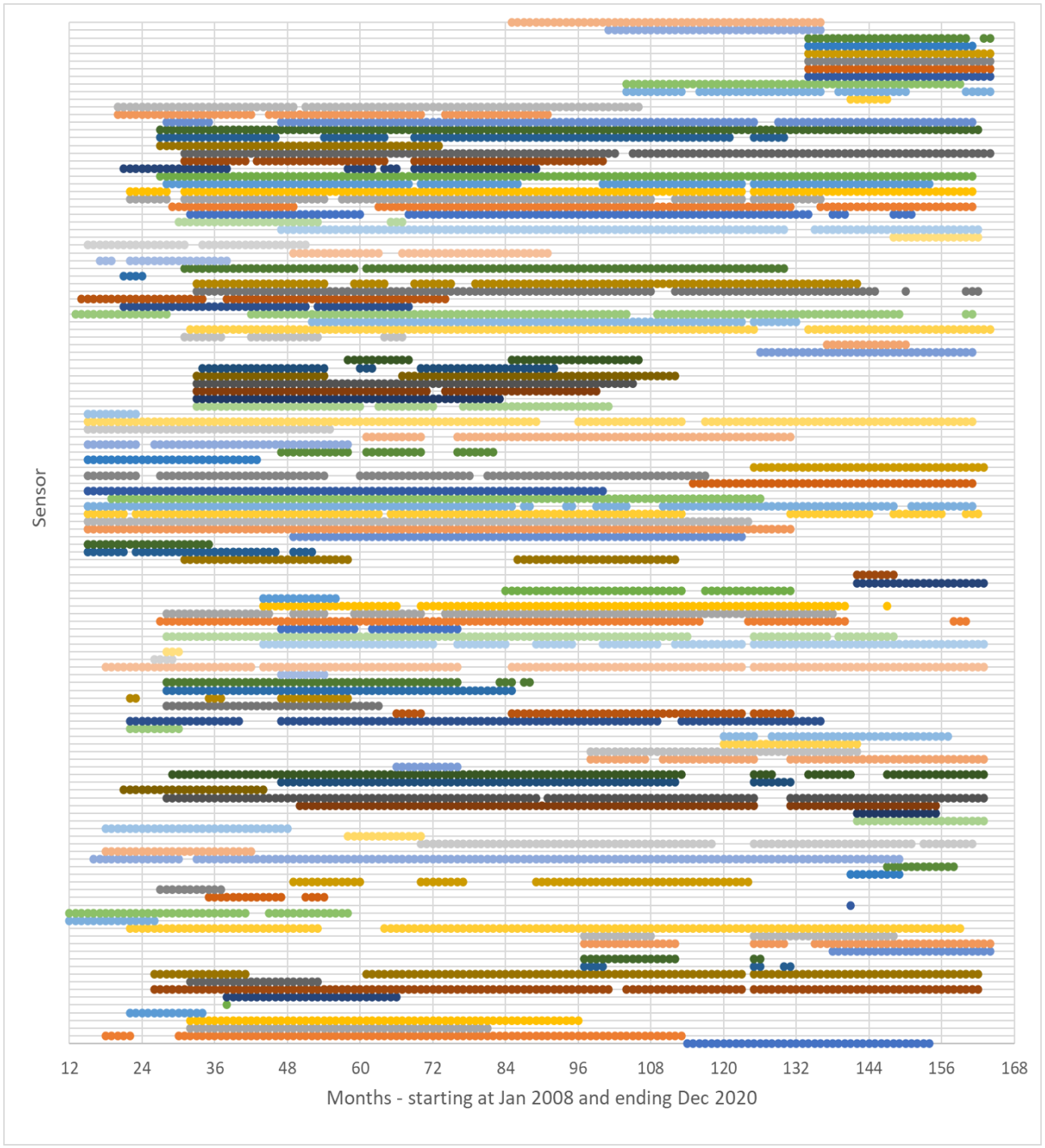


Figure 31: Sensor data completeness, each coloured row is an individual sensor and the a filled dot shows a month with data. Gaps and may be due to a sensor not been installed or having been removed, or a data error due to a sensor malfunction, where erroneous data have been removed.

Appendix 4: Wardening frequency

The table in this appendix summarises how warden time has been targeted by the UHP and Local Authority warden staff. It is drawn from a file provided by UHP.

Area	Site name	Location	Managing organisation	Site specific issues	Wardening frequency (April-Sept)	Wardening frequency (Oct-March)
West	Arne	Arne	RSPB		On request	On request
West	Corfe Bluff	Norton, Corfe Castle	ARC	Potential unwanted residents in car park area, fly tipping	On request	On request
West	Corfe Common	Corfe Castle	NT		On request	On request
West	Creech Hill	Creech, Purbeck	ARC	Motorbikes, grazing	Weekly	Monthly
West	East Holme	Holme, Purbeck	ARC	BMX, motorbikes	3 x weekly	Fortnightly
West	Gallows Hill	Turners Puddle, Bovington	ARC, DC	Potential gypsy/traveller problems	On request	On request
West	Great Ovens	Sandford	ARC	Dog fouling, bikes, encroachment	4 x Weekly	Weekly
West	Ham Common	Hamworthy, Poole	BCP/HCT	Litter, swimming in lake, close season fishing, fires	Daily	3x weekly
West	Hartland Moor/Middlebere		NE/NT		On request	On request
West	Lytchetts East	Upton	ARC	Dog fouling, litter, fires, encroachment, fly tipping	2 x weekly	Weekly
West	Lytchetts Central	Upton	ARC	Dog fouling, litter, encroachment of gardens, fly tipping	2 x weekly	Weekly

Area	Site name	Location	Managing organisation	Site specific issues	Wardening frequency (April-Sept)	Wardening frequency (Oct-March)
West	Sandford Heath	Sandford	NE	BMX, motorbikes, vandalism	3 x weekly	Weekly
West	Stoborough	Stoborough	NE	Dog fouling, grazing	3 x weekly	Fortnightly
West	Studland and Godlingston Heath	Studland	NT		On request	On request
West	Turlin Moor LNR	Hamworthy	BCP	Motorbikes, fire, burnt out cars, vandalism	On request	On request
West	Upton Heath (including Pinesprings and County Corner)	Upton	BCP, DC, DWT, BCP, private	Motorbikes, dog fouling, BMX, grazing	Daily	3x weekly
West	Wareham Forest		FC		On request	On request
West	Winfrith Heath	Winfrith	DWT	Fly tipping, dog fouling	Weekly	Monthly
West	Turners Puddle		DC	Motorbikes using bridleway, grazing	On request	On request
Central	Alder Hills	Poole	DWT	Litter, closed season fishing, fires	3 x weekly	2 x weekly
Central	Bourne Valley, Park Botton	Poole	BCP	Fires, grazing, motorbikes, litter, fly tipping, camping, dog fouling	Daily	3x weekly
Central	Canford Heath	Poole	BCP, private	Fires, motorbikes, dog fouling, mountain biking, vandalism, poaching of deer, rabbits, grazing	Daily	3 x weekly
Central	Barrow Hills	Corfe Mullen	BCP, private, ARC	Unauthorised grazing (mostly Corfe Hills north block), litter, fires, dog fouling	3 x weekly	Weekly
Central	Corfe Hills Rear of School	Poole	private	Litter, fires, dog fouling	3 x weekly	Weekly
Central	Corfe Hills middle & south block	Poole	BCP, ARC	Litter, fires, dog fouling	Weekly	On request
Central	Delph Woods	Poole	BCP	Litter, BBQs, camping	3 x weekly	3 x weekly

Area	Site name	Location	Managing organisation	Site specific issues	Wardening frequency (April-Sept)	Wardening frequency (Oct-March)
Central	Dunyeats Hill	Broadstone	ARC	BMX, litter, fly tipping, grazing	3 x weekly	1 x weekly
Central	Haymoor Bottom	Poole	BCP	Litter, fires, motorbikes	Weekly	2 x monthly
Central	Hengistbury Head	Southbourne	BCP	Grazing, litter, dog fouling, BBQs, camping, fires, kite flying, mountain biking	3 x weekly	1 x weekly
Central	Kinson Common	Kinson	BCP	Fires, motorbikes, dog fouling, grazing	3 x weekly	2 x weekly
Central	Meyrick Park and Pugs Hole		BCP	Monitoring sensors on site (changing data cubes)	On request	On request
Central	Redhill Common	Redhill	BCP	Motorbikes, dog fouling, fires	2 x weekly	2 x monthly
Central	Talbot Heath	Poole	BCP, private	BMX, dog fouling, motorbikes, fires	3 x weekly	weekly
Central	Turbary Common	Wallisdown	BCP	Fire, motorbikes, dog fouling, traveller encampments, fly tipping, grazing, poaching	Daily	Daily
Central	Warburton Road OS	Poole	BCP	Fire, motorbikes, dog fouling, traveller encampments, fly tipping	On request	On request
Central	Sherborn Crescent	Poole	BCP	Fire, motorbikes, dog fouling, traveller encampments, fly tipping	Weekly	On request
Central	Stour Valley	Muscliff	BCP	Grazing	2 x weekly	On request
Central	Milhams	Longham	BCP	Motorcycles, litter	On request	On request
East	Avon Heath Country Park	Ashley Heath	DC	Dog fouling, anti-social behaviour, fly tipping, fires, grazing, felling of trees	On request	On request
East	Dewlands Common	Verwood	BCP	Litter, dog fouling, grazing, fires	2 x weekly	2-3 x weekly
East	Ferndown Common	Ferndown	ARC	Den building, litter, dog fouling, horse riding, motorbikes	Daily	Daily
East	Holt Heath	Holt	NT	Dog fouling, horse riding, fly tipping	2 x weekly	2 x monthly

Area	Site name	Location	Managing organisation	Site specific issues	Wardening frequency (April-Sept)	Wardening frequency (Oct-March)
East	Lions Hill	Ashley Heath	ARC	Fly tipping of garden waste, encroachment	2 x monthly	Monthly
East	Noon Hill	Verwood	ARC	Check fence, check house	On request	On request
East	Parley Common	Ferndown	DC, BCP, ARC	Litter, dog fouling, fires, motorbikes, fly tipping of garden waste	Daily	Daily
East	Poor Common	Ferndown	BCP	Litter, dog fouling, fires	2 x weekly	2 x weekly
East	Potterne Hill	Verwood	BCP	Dog fouling, litter	Weekly visited with Verwood sites	Weekly visited with Verwood sites
East	Potterne Playing Fields and woodland (SANG)	Verwood	BCP		On request	On request
East	Slop Bog	Ferndown	DC	Vandalism, motorbikes, mountain bikes, grazing, fly tipping of garden waste	2 x weekly	2-3 x weekly
East	Stephens Castle	Verwood	BCP	Litter, dog fouling, BMX, grazing, vandalism	2 x weekly	2 x weekly
East	Town Common,	Christchurch, Hurn	BCP, DWT, FC, ARC	Motorbikes, fires, dogs, mountain bikes	Daily	Daily
East	St Catherine's Hill					
East	Uddens Heath	Ferndown	Private, BCP, ARC		On request	On request
East	Ramsdown		ARC	Motorbikes, mountain bikes and dog fouling	Weekly	2 x monthly
East	Sopley		DWT	Motorbikes	Weekly	2 x monthly
East	Troubles Field		DWT	Grazing	Weekly	2 x monthly)

Appendix 5: Selected examples of other European site mitigation schemes

This appendix summarises a selection of other European site mitigation schemes and broad approaches for mitigation in-place. The table only gives examples of schemes relating to recreation and urban effects[30]. The table only includes schemes that are established and it should be noted that there are also a number of schemes in development[31]. Hyperlinks relate to project specific websites or relevant local authority pages with further information and details. ZOI refers to zone of influence (e.g. for collection of developer contributions).

Area	Issues & sites addressed by mitigation strategy	'Exclusion zone'	ZoI	SANGs/GI	Wardening	Other mitigation measures	Monitoring measures	Further details and notes
Thames Basin Heaths	Recreation and urbanisation; heathland SPA	400m	5km	Minimum of 8ha of SANGs per 1000 residents	Thames Basin Heaths Partnership, currently c. 9 full time equivalents	Dog Project, education work and dedicated education officer.	Automated counters, vehicle counts, interviews, fire records, bird monitoring.	Long-running scheme. Each local authority has produced their own SPD/mitigation in line with agreed strategic approach.
South-east Devon	Recreation and urbanisation; sand dune SAC, heathland SPA/SAC and estuary SPA/Ramsar.	400m around heathland only	10km	Some SANG at strategic locations identified in strategy	2 Full-time equivalents.	Dog Project, bird refuges on estuary, patrol boat on estuary, codes of conduct.	Targeted work on effectiveness of refuges; some visitor survey work	3 local authorities, and various zones reflecting the relevant European sites.

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

[31] Locations with mitigation schemes in development include Braunton Burrows, Wealden Heaths, Cotswold Beechwoods

Area	Issues & sites addressed by mitigation strategy	'Exclusion zone'	ZoI	SANGs/GI	Wardening	Other mitigation measures	Monitoring measures	Further details and notes
Solent	Recreation impacts for 3 coastal SPA/Ramsar sites	No	5.6km	Some SANGs plus other infrastructure set out in mini 'Access Management Assessments' each focussed on different sections of coast.	Team of rangers	Awareness raising and wider promotion.	Automated counters, vehicle counts, interviews, targeted work testing effectiveness of ranger presence.	Bird Aware Project established with strong branding. More site-specific projects and awareness raising work still being developed.
Cannock Chase	Recreation impacts to heathland SAC	400m	15km	No	Delivery Officer and Engagement Officer only so far	Parking strategy and access management strategy for the SAC with series of interventions and targeted measures.	Vehicle counts, interviews.	6 local authorities have signed a joint memorandum of understanding which ensures joint approach
North Kent	Recreation impacts for 3 coastal SPA/Ramsar sites	No	6km	No	3 rangers	Dog Project, Codes of Conduct, Signage and Interpretation and Site Specific Enhancements	Liley & Underhill-Day (2013)	4 local authorities, each with slightly different approaches to developer contributions.
Essex Coast	Recreation impacts for 9 coastal SPA/Ramsar sites and 1 SAC	No	4.5-20.8km	No	Ranger team being built up over time, will include water-based ranger.	Education and communication, codes of conduct, habitat-based measures.	Visitor surveys, bird monitoring and vegetation monitoring	11 local planning authorities, joint SPD in preparation.

Area	Issues & sites addressed by mitigation strategy	'Exclusion zone'	ZoI	SANGs/GI	Wardening	Other mitigation measures	Monitoring measures	Further details and notes
Burnham Beeches	Recreation and urbanisation impacts for a woodland SAC	500m	5.6km	No	1 Engagement Ranger/SAC Ambassador	Electronic interpretation, events and promotion, access plan/carrying capacity study	Visitor surveys, soil and ecological impacts	Each local authority will develop their own mitigation approach. Chilterns and South Bucks described.
Suffolk Coast	Recreation impacts for 8 coastal/estuary sites including mix of SAC, SPA and Ramsar	No	13km	Large sites only.	Delivery officer and team of rangers	Dog Project, codes of conduct, signage and interpretation, awareness raising, range of site specific projects	Visitor surveys (counts and interviews), bird monitoring,	4 local authorities and joint strategy covering numerous sites along large stretch of coast
South Tyneside	Recreation impacts for coastal SAC and a coastal SPA	No	6km	No	Delivery office and 0.5 full time equivalent ranger post	Dog Project, review of parking.	Automated counters and bird surveys	Interim strategy established.
Poole Harbour	Recreation impacts for coastal SPA and Ramsar	No	Variable, not based on specific distance	Rolling 5 year programme of Infrastructure Projects	Project coordinator and a warden	Leaflets, litter clearance and engagement	Visitor and bird surveys	2 local authorities with a joint SPD
New Forest	Recreation impacts for SAC/SPA/Ramsar	No	District wide (note Test Valley currently apply a	8ha per 1000 residents for sites over 50 dwellings	Funding for additional National Park ranger time	Programme of enhancement of footpaths/rights of way and existing open spaces.	Site condition, visitor patterns.	Link and details given relate to New Forest District. Each authority currently following own approach with longer term aim for

Area	Issues & sites addressed by mitigation strategy	'Exclusion zone'	ZoI	SANGs/GI	Wardening	Other mitigation measures	Monitoring measures	Further details and notes
			13.6km zone)					a more joined-up approach
Ashdown Forest	Recreation (and urban effects) for heathland SPA	Yes	7km	Contributions towards SANG or options for developers to provide	Through Ashdown Forest Conservators	Code of conduct, awareness raising, volunteer dog rangers, dog related events	Visitor monitoring on SANG and the SPA	6 local authorities with work in partnership since 2012
South Pennine Moors SPA	Recreation, urban effects and supporting habitat for moorland SPA and SAC	400m	7km for recreation; 2.5km for supporting habitat	Improvements to existing GI	3 rangers and a delivery officer	Interpretation, awareness raising, access infrastructure, parking.	Visitor surveys, ecological monitoring	Draft SPD