# The London Borough of Haringey

# 2020 Natural Capital Account

# 1. Key messages

The purpose of this natural capital account is to establish a baseline for the value of public goods currently delivered by the parks and accessible greenspaces in the London Borough of Haringey.

The natural capital account shows that these 'natural capital assets' of the Borough provide many benefits that are not captured by financial accounts. Specifically – the account is presented in a balance sheet format (see Section 3.4) and shows that:

- Over the 60-year period of the account (2020-2080), the Borough's greenspaces will produce benefits of over £1,000 million in present value terms.

- 90% of this value is for public benefits including carbon sequestration, reduction in air pollution, and physical health and wellbeing from recreation.

- The most significant benefits are physical health and wellbeing benefits from recreation which make up around 80% of the value.

- The benefit estimates reflect the assumption that these natural capital assets of the Borough will be maintained, and the population will increase. The value would go down if the assets are not maintained to meet the needs of the existing or growing population. Different future scenarios could be tested using the baseline natural capital accounting approach followed here.

- The way nature provides us with benefits is far too complex for any analysis and natural capital accounting is not an exception. Therefore, this baseline account is partial, as it has not been possible to separately measure and value the following material benefits: uplift in the value of property adjacent to greenspaces, biodiversity, mental health, educational and volunteering benefits from learning and working in greenspace.

- Based on the current spending by the Borough (£11 million per year), the total spend of the accounting period is estimated to be around £300 million in present value terms. The spend is assumed to continue to maintain natural capital assets such as tree work and supporting manufactured assets such as play and sports facilities and park infrastructure.

The results from the natural capital account show that based on current spending and benefits there is a 3:1 return to maintaining Haringey's parks and accessible green spaces. This information can be used to:

- Communicate the benefits of Haringey's greenspace to stakeholders including the general public,
- Provide a framework to monitor the continued provision of benefits, and
- Develop a quantified measure of the returns to investing in maintaining parks and accessible green spaces and undertake scenario analysis for different investment and finance options.

# 2. Approach

This section describes the natural capital accounting method and scope used to develop a natural capital account for the London Borough of Haringey.

## 2.1 Method

Natural capital is "the *stock* of renewable and non-renewable natural resources (e.g., plants, animals, air, water, soils, minerals) that combine to yield a *flow* of benefits to people"[1]. A natural capital approach can be defined as applying the distinction between stocks and flows, measuring and valuing benefits and how these would change in future under different scenarios in order to understand the impacts and dependencies on natural capital[2].

Systematic and consistently generated evidence and repeated updates are what distinguish accounting from one-off assessments. Accounting offers comparability across space and time, bringing rigour to the presentation of different types of data on natural capital assets, the benefits they provide and the value of those benefits in terms of health and wellbeing of the population and financial returns to different parties over the accounting period. It also compares the value of such benefits to the cost of maintaining the assets and as such can inform spending and track the impact generated by relevant investments. The accounts can be repeated for different maintenance scenarios – in particular, comparing what *is **currently*** spent and what ***should be*** spent to maintain the assets so that they can continue to provide at least the benefits they currently do.

The accounting process is designed to answer five key questions:

I.      What natural capital assets do we have?
II.     What benefits do they provide and to whom?
III.    What are these benefits worth in monetary terms?
IV.     What does it cost to maintain the assets?
V.      How do costs compare to benefits over time?

Information from the organisation is used to answer Questions I and IV to create, what is called 'supporting schedules': asset register (I) and maintenance cost schedule (IV). Information from the organisation, external sources – literature, government recommended figures etc. and the expertise of the team is used to answer Questions II and III. The methods that establish which benefits are provided and value of those benefits are well-established, using recognised data sources, that have been developed and used by public bodies such as Defra and ONS. The assumptions behind the calculations and which benefits are / are not included in the accounts are reported as notes to the balance sheet, which answers Question V. In summary, the following supporting schedules are produced:

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[1] Source: Natural Capital Protocol https://naturalcapitalcoalition.org/natural-capital-protocol/
[2] Available at: https://naturalcapitalcoalition.org/wp-content/uploads/2019/06/NCC-WhatIs-NaturalCapitalApproach-FINAL.pdf

- **Natural Capital Asset Register (A1)** – which records the stock of natural capital assets in terms of their extent, condition, and spatial configuration (e.g., size and status of designated sites). These indicators help determine the health of natural capital assets and their capacity to provide benefits.

- **Physical Flow Accounts (A2)** – which quantifies the benefits that the assets deliver in metrics that are relevant to the benefit (e.g., tonnes of Carbon sequestered, number of visitors etc.). The changes in the quantity / quality of the assets and their benefit provision over time are also shown as much as data allows but most baseline accounts are an extension of the situation in the first year of the accounts.

- **Monetary Flow Accounts (A3)** – which estimates the economic value of the benefits in monetary terms. This uses data from actual markets and other (non-market) values. The projected future flow of these benefits over the accounting period is discounted to provide the present value for the assets.

- **Natural Capital Maintenance Cost Account (A4)** – which details the costs of activities required to maintain the capacity of the natural capital assets to provide benefits over the long term.

These supporting schedules provide the data to create the **natural capital balance sheet**. The format is deliberate – by mirroring the balance sheet of traditional financial accounting, the intention is to encourage users to think about the benefits of public greenspace in similar monetary terms. The balance sheet shows the 'asset values' (from the monetary flow account) and 'liabilities' (from the maintenance cost account). The comparison could test if the assets are sustainability managed if maintenance actions are planned for that purpose. But in the baseline account, the current level of spending and any committed future spending are accounted for. Whether this is enough (given increased population, environmental pressures such as climate change etc.) needs to be discussed as part of the interpretation of the accounts.

## 2.2 Scope

The geographical scope of the assessment is the parks and greenspace of the London Borough of Haringey and the natural capital assets within (including parks, woodland, recreation grounds, public gardens, and allotments).

The base year for the assessment is 2020. A 60-year timescale is used to estimate the present values[3]. All future benefit and cost streams are discounted at a suitable discount rate to bring values into 2020 terms. Carbon sequestration, recreation, physical health benefits and maintenance costs - are discounted at 3.5% (declining to 3.0% after 30 years), whilst air quality regulation benefits are discounted using a lower, health benefit, rate of 1.5% rate (declining to 1.3% after 30 years) in line with government guidance (HM Treasury, 2020).

The benefits included in the accounts are summarised in Table 2.1. The methods used to estimate both physical and monetary flows are consistent with government guidance and published evidence such as the ONS (2019) UK Natural Capital Accounts and the latest Defra publication 'Enabling a Natural Capital Approach' (ENCA) (Defra, 2020) which provides case studies and data sources for a variety of ecosystem

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[3] Recommended by HM Treasury (2020) guidance and is suggested as a minimum time period for appraising public spending.

services and benefits. Monetary values published in earlier years have been inflated to 2020 values using the HM Treasury (2021) GDP deflators. See Annex 1 for a detailed methodology on each benefit.

**Table 2.1:** **Benefits included in the account**

| Benefits | Physical metric | Valuation method | Beneficiaries |
|---|---|---|---|
| Recreation | Number of recreational visits to open greenspace | Total welfare value (ORVal) | Greenspace users |
| Income for Parks and Leisure services | None | Revenue from the council's financial accounts | Clients paying for parks and leisure services |
| Physical health due to active recreation | Number of active visits | Avoided medical treatment costs per year (Claxton et al., 2015) | Greenspace users |
| Air quality | PM2.5 removed by vegetation (kg/yr) | Avoided cost (treatment and productivity) plus welfare value (eftec and CEH, 2019) | Local resident population |
| Carbon sequestration | Carbon sequestered in woodland (tCO$_2$e/yr) | Non-traded central carbon value BEIS £/t/CO$_2$e (BEIS, 2020) | Global population |

Table 2.2 describes the trends that have been possible to quantify over the accounting period, the assumptions made to do so and notes on some other potentially important trends. Recreation and physical health benefits are expected to increase in line with the population growth in Haringey, where the population is expected to increase by 5% between 2020 and 2043 (ONS, 2020). However, the true impact of population growth is difficult to predict – a larger population may put more pressure on natural capital assets, so individual beneficiaries may put a lower unit value on them. To maintain the benefits, in the face of increasing population, more needs to be invested in maintaining existing assets and expanding them where possible. The future number and unit value of recreation visits will also depend on what is done to maintain the natural capital assets in the face of increasing demand for recreation as a result of a growing population.

In addition to general recreation, the revenue received by the council for parks and leisure receipts and rents is recorded as a benefit to the council. This revenue is for specific services (such as sports receipts, and commercial rents from parks) and not recreational visits, hence it is assumed that there is very little overlap in the two benefit streams.

## Table 2.2: Trends to profile the benefits over the accounting period

| Benefit | Change in physical flow | Change in monetary value |
|---|---|---|
| Recreation | Number of visits increases proportionally with local population growth in Haringey Borough (ONS, 2020). | Assumed no change in unit value per visit. If the assets are not maintained to respond to increasing population, the unit benefit and hence value will decline. |
| Income for Parks and Leisure services | Number of visits increases proportionally with local population growth in Haringey Borough (ONS, 2020). | Revenue increases in line with the local population. Charges for services remain in line with general inflation. |
| Physical health | Number of visits increases proportionally with local population growth. | Assumed no change in unit value of avoided medical treatment costs. It is not possible to predict which way this would go and hence the effect of this assumption on the account. |
| Air quality | Expected changes over time are already incorporated into the modelling of health benefits projected. | Expected changes over time are already incorporated into the modelling of health benefits projected. |
| Carbon sequestration | No change over time. | Expected changes in the value of carbon emissions over time are already incorporated, BEIS (2020). |

# 3. Summary of accounts

## 3.1   Natural capital asset register

The asset register includes the open greenspace in the Haringey Borough as shown in Table 3.1.

**Table 3.1:** London Borough of Haringey natural capital asset register - extent

| Asset | Area (ha) | % |
|---|---|---|
| Amenity grassland | 250 | 50% |
| Woodland | 127 | 25% |
| Street trees and isolated trees | 35 | 7% |
| Woodland shrub | 30 | 6% |
| Water body | 21 | 4% |
| Grassland/meadow | 15 | 3% |
| Shrubs | 13 | 3% |
| Water margin | 2 | 0.5% |
| Herbaceous | 1 | 0.2% |
| **Total** | **494** | **100%** |

Source: Survey data from Audit performed by John Sheaff Associates (2020)

Indicators of asset condition provide insight into the health and capacity of the natural capital in the Borough to sustain levels of benefit and support to the local economy. Ideally this would include measures of the condition of key assets that underpin each of the benefits (such as soil condition - measured by organic matter content amongst other measures). This study provided an assessment for each habitat type based on survey information provided by John Sheaff Associates. Table 3.2 sets out the condition of each natural habitat type. Most habitat types are in fair condition (75% overall), and amenity grassland has the highest percentage in good condition (38%), followed by grassland/meadow (33%). Less than 2% of the area is in poor condition which is very low. If a more significant area had been in poor condition, it may have been appropriate to reduce benefit values (such as recreation) accordingly, however at this level any reduction in benefit level is likely to be negligible.

**Table 3.2:** London Borough of Haringey natural capital asset register - condition

| Asset type | Good | | Fair | | Poor | |
|---|---|---|---|---|---|---|
| | Area (ha) | % | Area (ha) | % | Area (ha) | % |
| Amenity grassland | 95 | 38% | 148 | 59% | 7 | 3% |
| Woodland | 3 | 2% | 123 | 97% | 1 | 1% |
| Street/isolated trees | 7 | 19% | 28 | 81% | <1 | 0% |
| Woodland shrub | 1 | 2% | 29 | 97% | <1 | 1% |
| Water body | 2 | 8% | 19 | 92% | <1 | 0% |
| Grassland/meadow | 5 | 33% | 10 | 67% | <1 | 0% |
| Shrubs | 3 | 22% | 10 | 76% | <1 | 2% |
| Water margin | <1 | 11% | 2 | 89% | <1 | 0% |
| Herbaceous | <1 | 22% | 1 | 73% | <1 | 5% |
| **Total** | **116** | **23%** | **370** | **75%** | **8** | **2%** |

Source: Survey data from Audit performed by John Sheaff Associates (2020)

The condition of designated sites is an important measure of the state of priority biodiversity assets. There are five designated local nature reserves – Queen's Wood, Parkland Walk, Railway Fields, Coldfall Wood and Alexandra Palace/Park – covering approximately 130 ha of the Borough (Natural England, 2021). There are no national land designations (Sites of Special Scientific Interest or Special Areas of Conservation) within the boundary.

## 3.2   Overview of benefits

This section presents the estimated annual physical and monetary values of benefits, and their present value over 60 years. Both physical and monetary annual flows are given a confidence rating, which is described in Table 3.3. Annex 1 provides explanation for the confidence rating for each benefit.

**Table 3.3:** **Levels of confidence in physical and monetary flow evidence**

| Level of confidence | Symbol | Description of confidence |
|---|---|---|
| Low | ● | Evidence is partial and significant expert judgement-based assumptions are made so that the data provides only order of magnitude estimates of physical quantity or monetary value |
| Medium | ● | Science-based assumptions and published data are used but there is some uncertainty in combining them, resulting in reasonable confidence in using the data to guide decisions and spending choices. |
| High | ● | Evidence is peer reviewed or based on published guidance so there is good confidence in using the data to support specific decisions and spending choices. |

As shown in

Table 3.4, the total value of the natural capital benefits in 2020 are estimated to be around £38 million per year. Recreation (£19 million) and physical health (£11 million) benefits hold the highest values, contributing 50% and 30% respectively to total value.  Air quality benefits contribute approximately £3 million per year and carbon sequestration contributes £0.1 million.  The total present value for the public benefits of natural capital assets, over 60 years, is £911 million. This asset value considers the trend assumptions set out in

Table 2.2.

**Table 3.4:** Summary of benefits

| | Physical flow (unit/yr) | | Monetary value | | | |
|---|---|---|---|---|---|---|
| | **2020** | **Units** | **Valuation metric** | **Annual value (2020 £m)** | **PV 60 (£m)** | **Confidence** |
| **Key monetised benefits** | | | | | | |
| Carbon sequestration | 1,107 | Total CO$_2$e sequestered (tCO$_2$e/yr) | Total value of CO$_2$e sequestered | 0.1 | 5 | 🟡 |
| Air quality | 1,053 | PM2.5 removal by woodland (kg/yr) | Value of PM2.5 removal by woodland | 3 | 88 | 🟢 |
| Recreation | 6,440,043 | Total recreation visits (visits/yr) | Total recreation welfare value | 19 | 512 | 🟢 |
| Income for Parks and Leisure services | - | None | Total revenue to the council | 4 | 98 | 🟢 |
| Physical health | 3,316,622 | Total active visits (active visits/yr) | Total avoided medical treatment costs | 11 | 305 | 🟡 |
| **Total** | | | | **38** | **1,009** | |

**Key non monetised benefits -** The following are recognised as material benefits from natural capital, but currently cannot be reliably measured or valued:

- **Property uplift:** A well-designed and maintained green space can add to the aesthetic setting of an area, impacting its attractiveness to prospective residents and businesses. In this way, green infrastructure has been shown to positively impact property values, as properties near green space benefit from this improved setting. This improvement will increase user demand to utilise the property, for example to buy/rent for residential or commercial purposes. Some of the value reflected in property premiums may double count with recreation value and physical health benefits – users may be willingness to spend more on a house near greenspace which may be indicative of the extra recreation value and physical health benefits that the buyer might expect to receive in future.

- **Biodiversity:** The monetary valuation of biodiversity is complex and, in many contexts, contentious. A portion of this value is indirectly captured in the biodiversity indicators presented in the account for area of local nature reserves, as well as through the value of other benefits to which biodiversity contributes (e.g., contribution to recreational benefits).

- **Mental health:** Following current ENCA guidance (Defra, 2020), only physical health benefits are valued in this report as there is insufficient evidence to value mental health benefits in general terms. While the evidence for mental health benefits from green space is strong, it is context dependent and cannot be readily quantified for the purposes of accounting and policy analysis.

- **Education:** Educational visits to nature are known to increase educational attainment as well as improving wellbeing for pupils. However, this is not possible to quantify or value. Instead, the proxy value of the costs of providing outdoor learning activities can be provided on the assumption that the benefits must be perceived to be at least as much as the costs (see ENCA (Defra, 2020) for further guidance). However, data was not available for the total number of such visits by schoolchildren per year across the Borough.

- **Volunteering:** Like educational visits, volunteer activities also generate wellbeing benefits which are difficult to quantify and value at this scale. Therefore, they are valued based on the equivalent resource cost of a volunteering hours (e.g., from Heritage Fund, n.d.). As with education, data was not available for the total number volunteer days per year across the Borough.

# 3.3    Overview of maintenance costs

Natural capital benefits can only be sustained if the underlying assets are maintained in a healthy condition. The aim of a natural capital maintenance cost assessment is to establish the cost of the activities necessary to sustain natural capital condition in the long term.

In the timescales of this project, it was not possible to assess the maintenance activities required to sustain natural assets. The approach taken in this account has been to use current levels of expenditure to compare to benefits levels, recognising that it is not possible to draw the conclusion that existing maintenance is necessarily sufficient to sustain those benefit levels into the future.

Furthermore, the benefits included in the account also depend upon the provision and maintenance of non-natural capital assets, such as play areas, sports pavilions, outdoor gym areas, pathways, security assets etc. Given that the benefits are co-produced by both natural and manufactured capital, the maintenance of both have been included in this account.

Within the natural capital balance sheet, the costs of natural capital maintenance activities that arise from legal obligations, such as for managing designated habitats, are reported separately from other maintenance liabilities. All other remaining maintenance costs, such as management of green spaces, grounds maintenance and tree-works are accounted as 'other maintenance costs.'  In the scope of this project, it was not possible to distinguish costs arising from legal obligations, hence all costs have been reported as 'other maintenance costs.'

The finance department of Haringey Borough Council provided the following information for the Parks and Leisure department:

1.  Budget and actual spend (and income) for the three financial years (2017/18, 2018/19 and 2019/20)
2.  The five year capital programme (covering the years 2021/22 to 2025/26) and the anticipated capital spend for 2020/21.

These figures are used to assess on ongoing level of current spend on parks and green spaces and is summarised in Table 3.5. Operational expenditure covers labour, third party contractor, transport and premises related expenses. Corporate support recharges are overhead charges covering corporate functions such as IT, HR, and finance functions. The capital expenditure programme is well defined for the years 2020 to 2024, and the average level of expenditure over these years was used as the basis for an estimated of long-term capital spend to maintain assets and support benefit levels.

To maintain benefits in the face of increasing population, more needs to be invested in maintaining existing assets and expanding as necessary overtime. Consequently, future maintenance costs have been escalated in line with the forecast growth in population for the Borough of Haringey.

**Table 3.5:** **Summary of Maintenance Costs**

| Expenditure | Annual Cost (£k) | 60-year PV (£k) | Notes |
|---|---|---|---|
| Operational expenditure | 5,112 | 138,768 | Based on latest expenditure for 2019/20 |
| Corporate support recharge | 1,398 | 37,785 | Based on latest expenditure for 2019/20 |
| Capital expenditure | 4,617 | 121,084 | Average of planned spend for the years 2020-2024 |
| **Total** | **11,127** | **297,637** | |

# 3.4   Natural capital balance sheet

Table 3.6 is the natural capital balance sheet for Haringey's parks and greenspaces. It shows that parks and open spaces provide public benefits worth over £900 million over 60 years (to 2080). This is nearly ten times the value of the revenue that the council's Parks and Leisure service receives (£98 million). Capital maintenance costs over the same period are estimated at £298 million in total, and all these costs fall to the London Borough of Haringey. The costs of maintaining natural capital are less than a third of the value of the benefits the sites provide.

**Table 3.6:** **Natural Capital Balance Sheet at 31 March 2021**

| | PV* (60 Years) £'m | | |
|---|---|---|---|
| **Asset values (monetised)** | To the Council | To the public | Total |
| Carbon sequestration | | 5.2 | 5.2 |
| Air quality | | 88.0 | 88.0 |
| Recreation | 98.2 | 512.3 | 610.5 |
| Physical Health | | 305.3 | 305.3 |
| **Total gross asset value** | **98.2** | **910.7** | **1,009.0** |
| Liabilities | | | |
| Legal provisions | | | - |
| Other maintenance provisions | (297.6) | | (297.6) |
| **Total maintenance costs** | **(297.6)** | **-** | **(297.6)** |
| **Total net asset value (monetised)** | **(199.4)** | **910.7** | **711.3** |

Note*: Present value calculated over 60 years, 3.5% discount rate declining to 3% after 30 years, except air quality which uses the health adjusted rate of 1.5%, declining to 1.3% after 30 years.

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# Annex 1

This annex describes the approaches used to quantify and value the (ecosystem service) benefits provided by natural capital assets in the London Borough of Haringey account.

## Carbon sequestration

Carbon sequestration is provided by woodland and improved grassland areas within the accounting boundary. This benefit is estimated by the sequestration rates for each habitat (tonnes $CO_2$ equivalent per hectare) and the non-traded price of carbon.

**Table A.1:** Carbon sequestration rates by habitat type

| Habitat | Sequestration rate | Source |
|---|---|---|
| Woodland | 5.7 $tCO_2e$/ha/yr | ONS (2019) and Forestry Commission (2017) |
| Improved grassland[1] | 0.6 $tCO_2e$/ha/yr | Soussana et al. (2010)**Error! Bookmark not defined.** |

[1] This value is applied to areas grassland/meadows set out in the asset register (Table 3.1).

Table A.1 shows the per hectare carbon sequestration rates for woodland and improved grassland that are used within this assessment. The unit sequestration factors used are 5.7 tonnes $CO_2e$ per hectare per year for woodlands, which has been estimated using the total carbon dioxide equivalent sequestered by forestland in the UK (ONS, 2019) and the total area of woodland in the UK (Forestry Commission, 2017). This covers both coniferous and broadleaved woodland. Improved grassland is estimated as 0.18 tonnes of carbon sequestered per hectare (Soussanna et al., 2010). The rates for improved grassland have been converted to tonnes $CO_2e$ using a conversion factor of 3.67 (IPCC, 2018). Sequestration rates are assumed to remain constant over time.

The total amount of $CO_2$ equivalent sequestered is estimated by multiplying these per hectare rates with the total hectare of the respective habitat type, as recorded in the asset register. The amount of $CO_2e$ sequestered is then valued following the BEIS (2020) guidance. The economic value of carbon sequestration in the account boundary is estimated using the non-traded central price, £75 per tonne of $CO_2e$ in 2020. This is multiplied by the estimated tonnes of $CO_2e$ sequestered. The value of carbon emissions increase over time in line with BEIS (2020).

## Air quality

Air quality benefit included in the baseline natural capital account arises from the ability of different types of vegetation to remove pollutants from the air. This benefit is estimated by the amount of PM2.5 removed by woodland and the avoided human health risks and medical costs associated.

Jones et al. (2017) modelled this benefit for the UK national accounts reflecting the variety of different levels of PM2.5 concentration, types and extent of vegetation and density of human population across the country. An update to this study (CEH and eftec, 2019) has produced estimates of PM2.5 removal per hectare of woodland by local authority across the UK. The benefit of removal is estimated as the avoided health care cost (CEH and eftec, 2019).

This baseline natural capital account shows the per hectare benefit from the CEH and eftec (2019) model for the local authority area of Haringey multiplied by the total woodland area (including woodland and area of isolated street trees) in the Borough (from the natural capital asset register).

# Recreation

Recreational benefit is measured in terms of the number of visits to accessible greenspaces, and the average welfare value associated with these visits. This benefit is estimated by the number of visits and welfare value per visit. The online tool ORVal[4] is used to for this purpose. The tool also breaks down the estimated number of visits and associated welfare value by socio-economic group. The physical flow (number of annual visits) increases in line with the population growth of Haringey (ONS, 2020).  As population projections are only available until 2043, it is assumed total population remains constant thereafter. The monetary value (welfare value) is assumed to remain constant over time.

These visits and associated values are linked to approximately 110 open greenspace sites identified in ORVal within the Haringey Boundary – covering approximately 500 ha. Table A.2 provides a summary of each open greenspace type identified in ORVal. Alexander Palace and Park, categorised under nature, covers nearly 65 ha. Other notable parks are included under the Park category, including Finsbury Park (48 ha), Tottenham Marshes (32 ha) and Lordship Recreation Ground (23 ha). 200 sites were accessed for the natural capital asset register so the estimates from ORVal provide an underestimate in the value of recreation.

**Table A.2: Areas of open greenspaces identified in ORVal**

| Open greenspace type | Area (ha) |
|---|---|
| Park | 185 |
| Nature | 110 |
| Amenity Park | 63 |
| Wood | 37 |
| Allotment | 33 |
| Golf | 32 |
| Garden | 20 |
| Recreation ground | 5 |
| Cemetery | 2 |
| Grave Yard | 0.7 |
| **Total** | **487** |

It should be noted that the data from ORVal takes into account the location of the recreation asset, surrounding population, habitat type(s) and local alternatives, but makes the assumption that accessible green space is in average condition for its type. If the green space is in a better (worse) condition than average, this will likely have higher (lower) values for number and welfare value of visits. Similarly, as the

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[4] ORVal is a spatial model that shows the recreational sites, number of visits and the benefit to visitors using data from mapping tools, Monitor of Engagement in Natural Environment (MENE) survey and economic valuation literature. University of Exeter (2018) ORVal v2.0 - The Outdoor Recreational. https://www.leep.exeter.ac.uk/orval/

model underlying ORVal is based on MENE data[5], it does not take into account visits by children or overseas visitors to the UK.

# Physical health

In addition to improving the general welfare of visitors, if people are active during their visits, recreation can also have measurable physical health benefits. 'Active' is is defined as those who met recommended physical activity guidelines either fully, or partially, during weekly visits. This benefit is estimated by the proportion of the visits that are active, the health benefits of active recreation (in terms of improvements in Quality Adjusted Life years – QALYs[6]) and the economic value of health improvement (in terms of the avoided health cost due to improvement in QALY).

White et al. (2016) estimate that 51.5% of recreation visits are 'active'. The White et al. (2016) proportion of active visits is applied to the annual visits to greenspaces within the account boundary, producing the number of annual active visits. As with the number of annual recreation visits, they increase in line with population growth forecasts from ONS (2020).

The benefit of active recreation is measured as the improvement in QALYs. Beale et al. (2007) analysed Health Survey for England data, estimating that 30 minutes a week of moderate-intense physical exercise, if undertaken 52 weeks a year, would be associated with 0.0106768 QALYs per individual per year. Beale et al. (2007) assume this relationship between physical activity and QALYs is both cumulative and linear. Claxton et al. (2015) estimate a cost-effectiveness threshold of a QALY to be roughly £12,900/QALY in 2008 prices. This figure represents the additional cost that has to be imposed on the health system to forgo one QALY of health through displacement. It is used as a proxy for health costs, reflecting the avoided health costs when QALY is improved by one unit. Based on this information, the avoided health cost is estimated as £3.28 in 2020 prices. The monetary unit value is assumed to remain constant over time.

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[5] See: https://www.gov.uk/government/collections/monitor-of-engagement-with-the-natural-environment-survey-purpose-and-results
[6] QALY is a health measurement used widely in health and health economics research. QALY of zero denotes death, and 1 denotes full health.

# Confidence rating for benefits

Table A.3 provides an explanation for confidence rating set for each benefit included in the account.

**Table A.3:** Confidence rating for benefits in the assessment

| | Physical flow (unit/yr) | | Monetary value (£m) | |
|---|---|---|---|---|
| | Rating (drop-down) | Reason | Rating (drop-down) | Reason |
| **Key monetised benefits** | | | | |
| Carbon sequestration | Medium | Makes use of best available sequestration rates, as cited in ENCA (Defra, 2020). Uncertainty around whether improved grassland sequesters or emits. | Medium | BEIS (2018) carbon prices s based on the older 80% reduction commitment. They are under review, but approach follows current government guidance (HMT, 2018). |
| Air quality | High | Based on modelling by eftec and CEH (2019). Use of the tool is cited in ENCA (Defra, 2020). | High | Based on modelling by eftec and CEH (2019). Use of the tool is cited in ENCA (Defra, 2020). |
| Recreation | High | Based on selecting the Local Authority in ORVal. Approach features in ENCA (Defra, 2020). | High | Based on selecting the Local Authority in ORVal. Approach features in ENCA (Defra, 2020). |
| Physical health | Medium | Based on White et al. (2016) assumption of active visits and recreation outputs. Approach features in ENCA (Defra, 2020). | Medium | Medical treatment costs per QALY based on 2008 health spending. Approach features in ENCA (Defra, 2020) |

| Level of confidence | Symbol | Description of confidence |
|---|---|---|
| Low | • | Evidence is partial and significant assumptions are made so that the data provides only order of magnitude estimates of value to inform decisions and spending choices. |
| Medium | • | Science-based assumptions and published data are used but there is some uncertainty in combining them, resulting in reasonable confidence in using the data to guide decisions and spending choices. |
| High | • | Evidence is peer reviewed or based on published guidance so there is good confidence in using the data to support specific decisions and spending choices. |
| No colour | • | Not assessed |