

# Summary of methodology used for Greater Manchester NCA

This presents an overview of the methodologies used in valuing the estimated benefits provided by natural capital in Greater Manchester. Below is a synopsis of the relevant data sources and calculations. Additional information on methods used can be found in the detailed methodology report.

## Equations and data sources for Valuation of Ecosystem Services in Greater Manchester

Ecosystem Service	Calculation	Source
Air quality	Area (ha) and type of vegetation * volume and type of air pollutants removed by vegetation * avoided health care costs associated with avoided exposure to pollutants (including £ per hospital admission, life years lost, and death)	<p>Ordnance Survey (2017)</p> <p>Office for National Statistics (2017)</p> <p>World Health Organisation (2017)</p> <p>Department for Environment, Food and Rural Affairs (2017)</p> <p>Beale et al. (2007)</p> <p>Public Health England (2010, 2015)</p> <p>Mills et al. (2015)</p> <p>Atkinson et al. (2014)</p>
Recreation	Area (identified within ORVal) of publicly accessible green spaces * estimated number of visitors valued by costs of travel according to varying socioeconomic and green space characteristics (£)	Exeter University (2017)
Physical health	<p>Area of publicly accessible green spaces * estimated number of visitors * proportion of visits that are 'active' * avoided costs of inactivity (£/active visit)</p> <p>And</p> <p>Area of publicly accessible green spaces * estimated number of visitors * proportion of visits that are 'active' * QALYs per active visit * value of each QALY (£)</p>	<p>Office for National Statistics (2017)</p> <p>Natural England (2014)</p> <p>White et al. (2016)</p> <p>Beale et al. (2007)</p> <p>HM Treasury (2017)</p> <p>Department of Health and Social Care (2013)</p> <p>Public Health England (2017)</p>
Mental health	Density of green space by LSOA (%) * population (persons) * improvement in mental health outcomes due to green space density (per person) * avoided mental health care cost (£/person)	<p>Office for National Statistics (2017)</p> <p>Ordnance Survey (2017)</p> <p>White et al. (2013)</p> <p>HM Treasury (2017)</p> <p>Centre for Mental Health (2010)</p>
Noise regulation	Area (ha) and type of vegetation * noise in decibels (dBA) reduced by vegetation * number of buildings receiving noise reduction * value of change in noise levels by noise bands (£ per noise band)	<p>eftec, Centre for Ecology and Hydrology (CEH) and Collingwood Environmental Planning Limited (CEP) (2017)</p> <p>Ordnance Survey (2017)</p> <p>Department for Environment, Food and Rural Affairs (2017)</p>

Climate regulation	<p>Area (ha) and type of vegetation * cooling effect of green space per habitat type (°C) * avoided energy cost (£)</p> <p>And</p> <p>Area (ha) and type of vegetation * cooling effect of green space per habitat type (°C) * avoided productivity losses (£)</p>	<p>Ordnance Survey (2017)</p> <p>Office for National Statistics (2017)</p> <p>Hathway and Sharples (2012)</p> <p>O'Malley et al. (2015)</p> <p>Costa et al. (2016)</p> <p>Met Office (2017)</p>
Carbon sequestration	<p>Area of woodland (ha) * carbon equivalent sequestered per hectare of woodland (tCO<sub>2</sub>e/ha) * cost of carbon equivalent (£/tCO<sub>2</sub>e)</p> <p>And</p> <p>Area of peat (ha) * carbon equivalent sequestered per hectare of peat (tCO<sub>2</sub>e/ha) * cost of carbon equivalent (£/tCO<sub>2</sub>e)</p>	<p>Centre for Ecology and Hydrology (2015)</p> <p>Forestry Commission (2012)</p> <p>Department for Business, Energy and Industrial Strategy (2017)</p> <p>Natural England (2010)</p> <p>Pearce (1994)</p>
Food production	<p>Area (ha) and type of agricultural production * gross margin per crop/agricultural product (£/ha)</p>	<p>Centre for Ecology and Hydrology (2015)</p> <p>John Nix Farm Management (2017)</p>
Minerals extraction	<p>Aggregate land bank in Greater Manchester (million tonnes (mt)) * mineral asset value (£/mt)</p>	<p>North West Aggregate Working Party (2016)</p> <p>Office for National Statistics (2015)</p>
Amenity	<p>Stock of properties per MSOA * Estimated number of properties (per M<sup>2</sup>) within 300m buffer of greenspace * (%) uplift due to proximity to greenspace.</p>	<p>Office for National Statistics (2016)</p> <p>Ordnance Survey (2017)</p> <p>Brander and Koetse (2011)</p> <p>HM Treasury (2013)</p>
Water Quality	<p>Estimated length of watercourse under regulation of the 'Water Framework Directive' * NWEB value to watercourse (assuming one eco-class below to current status)</p>	<p>Environment Agency (2017)</p> <p>UK National Ecosystem Assessment (2012)</p>
Flood risk	<p>Proportion of flood risk area (high, medium, low) in MSOA * probability of flood risk occurring per annum depending on categorisation of flood risk area as high, medium or low * no. of properties in MSOA * weighted annual average damages (£).</p>	<p>Office for National Statistics (2017)</p> <p>Middlesex University (2017)</p> <p>Environment Agency (2017)</p>
Water resources	<p>Volume of water abstracted by use type (m<sup>3</sup>) * unit cost of water by use type (£/m<sup>3</sup>)</p>	<p>Environment Agency (2017)</p> <p>UK National Ecosystem Assessment (2012)</p>

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