Swindon & Wiltshire LOCAL ENTERPRISE PARTNERSHIP

UNIVERSITY OF BATH

Natural Capital:

Specifying the Value of Nature

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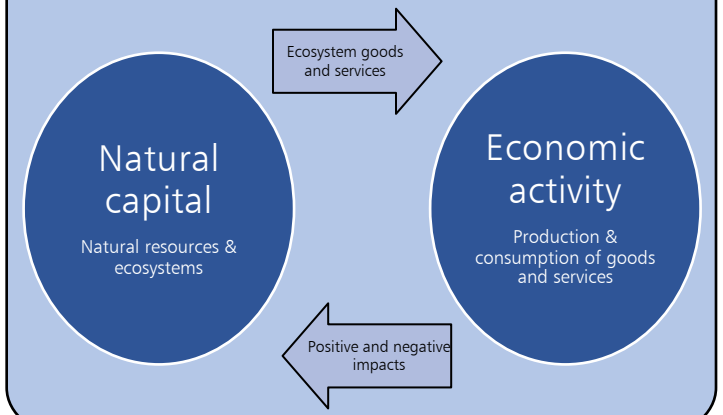
2nd February

The figures in these slides are only provisional and subject to change

Overview

What is Natural Capital?



How can we measure it?

Physical Accounts
(Ecology side)

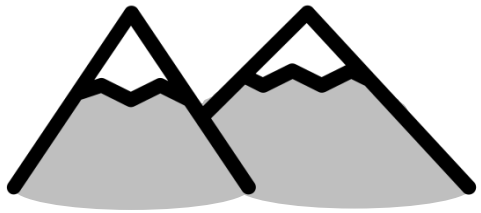
↓

Monetary Accounts
(Economic side)

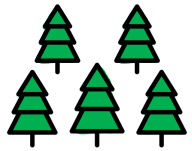
How can we use this information?

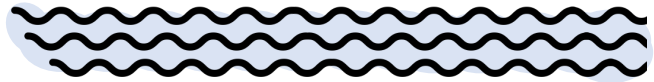
- This is vital for understanding the potential environmental impact of policy options and making evidence-based decisions.
- Natural capital and environmental safeguarding underpins sustainable local economic growth.
- Measuring it can help us understand the local contribution to the Government's Green agenda.

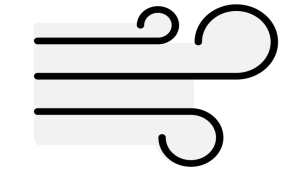
Understanding natural capital



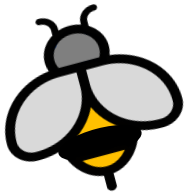
Environmental Assets

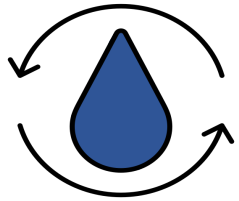






Ecosystem Services



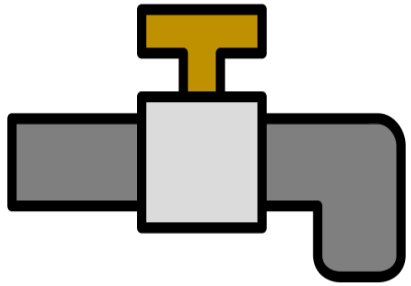


Broad Habitat Type	
Urban	Mountains, Moors and Heathland
Enclosed farmland	Woodland
Freshwater	

Category	Captured in Natural Capital Accounting
Provision services	Agriculture biomass (i.e. food and crops), timber, water supply
Abiotic flows	Solar, wind and tidal power
Regulating services	Air filtration, water regulation, noise mitigation
Cultural services	Recreation activities, value added to house prices

Is natural capital different from other types of capital?

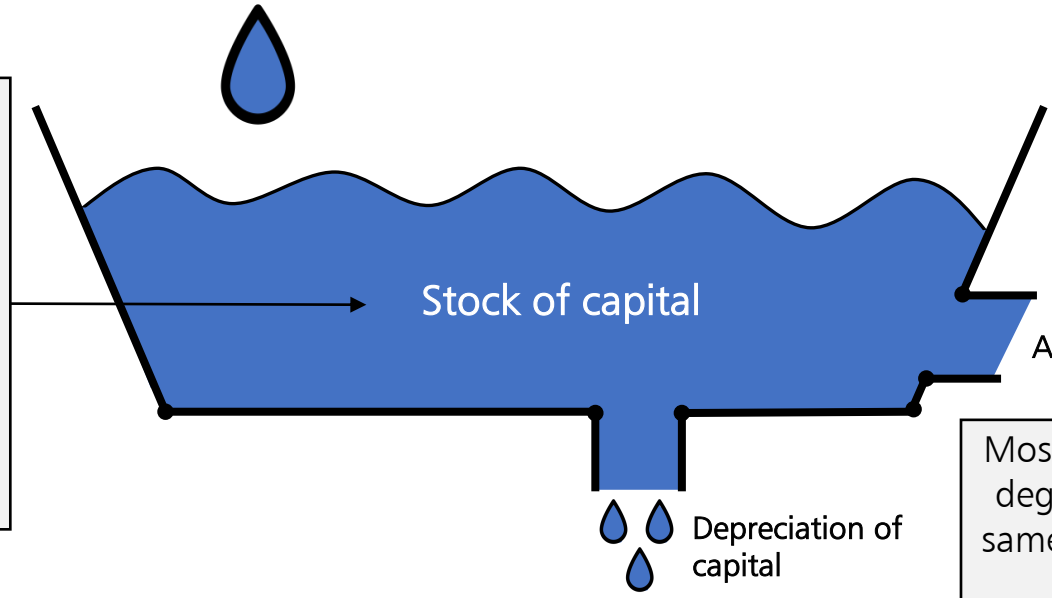
Similar to the fields of business or accounting, natural capital can be explained by the concept of stock and flows.



Flow of new investment and capital

The flow is measured over a period of time, such as a year. This typically might be seen in the form of new investments into buildings, machinery, tools (inputs for production). For natural capital is could in the form of new environmental assets such as trees, or repurposed grasslands.

The stock is usually measured at a specific point in time. The stock of capital represents the value of all the assets a business has, this captures long term value the assets could provide (i.e. over the next 10 years). For the natural capital value this concept is the same, capturing the long-term value of all our environmental assets.

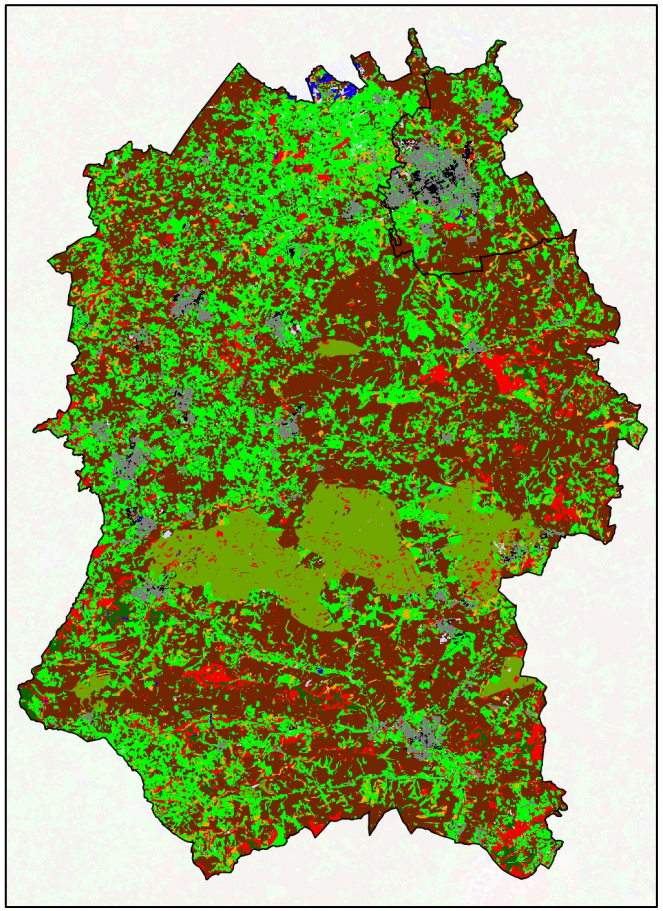


The assets or capital a business has typically provides an annual value in the shape of revenue or profits. For natural capital the stock of environmental asset provides ecosystem services.

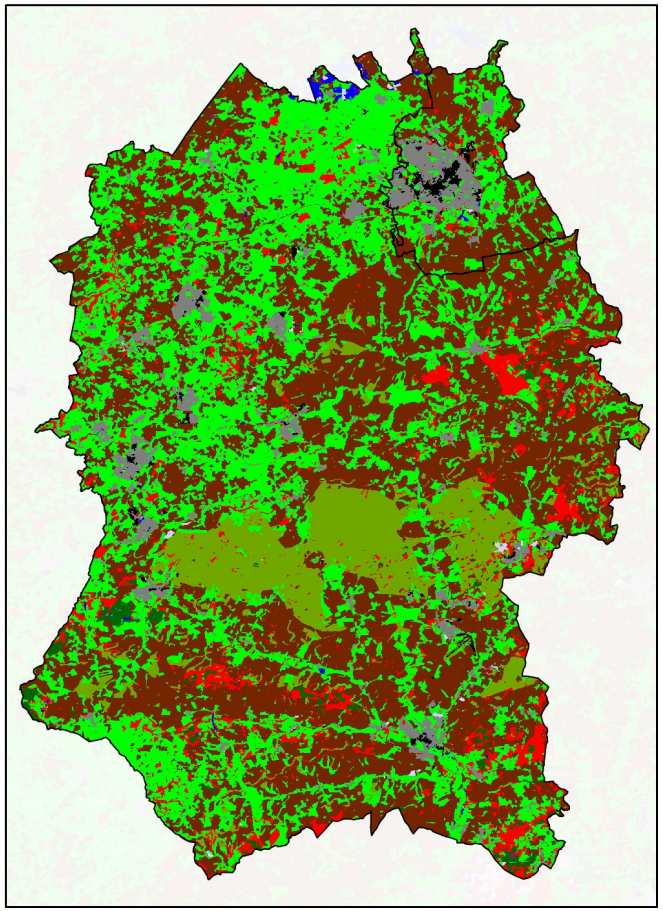
Most assets typically have a life cycle, which slowly degrades over time as they depreciate. This is the same for environmental asset, which slow degrade or get depleted over time.

What ecosystem assets do we have in Swindon and Wiltshire?

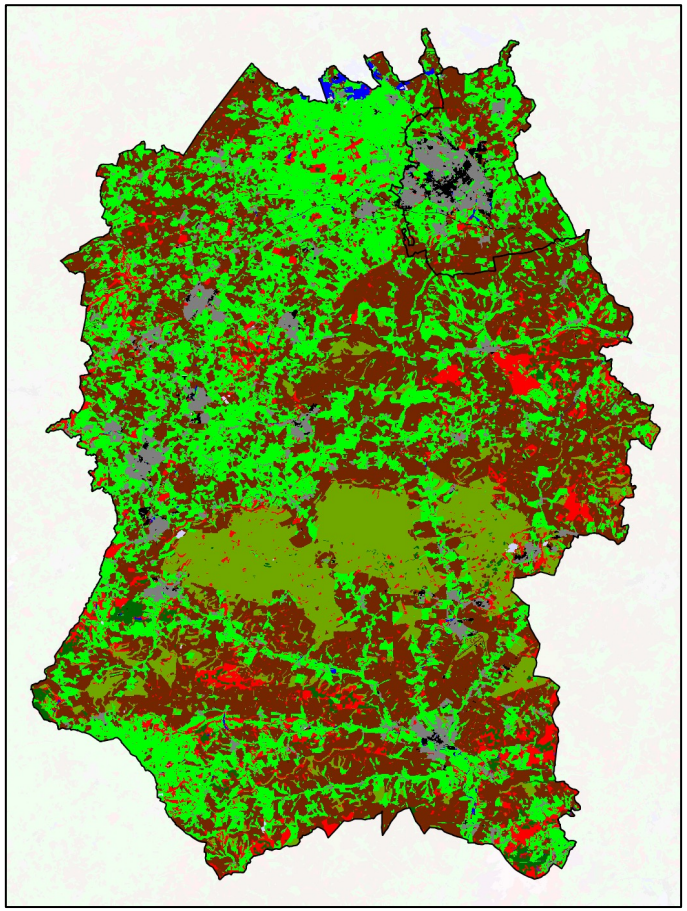
2007



2015



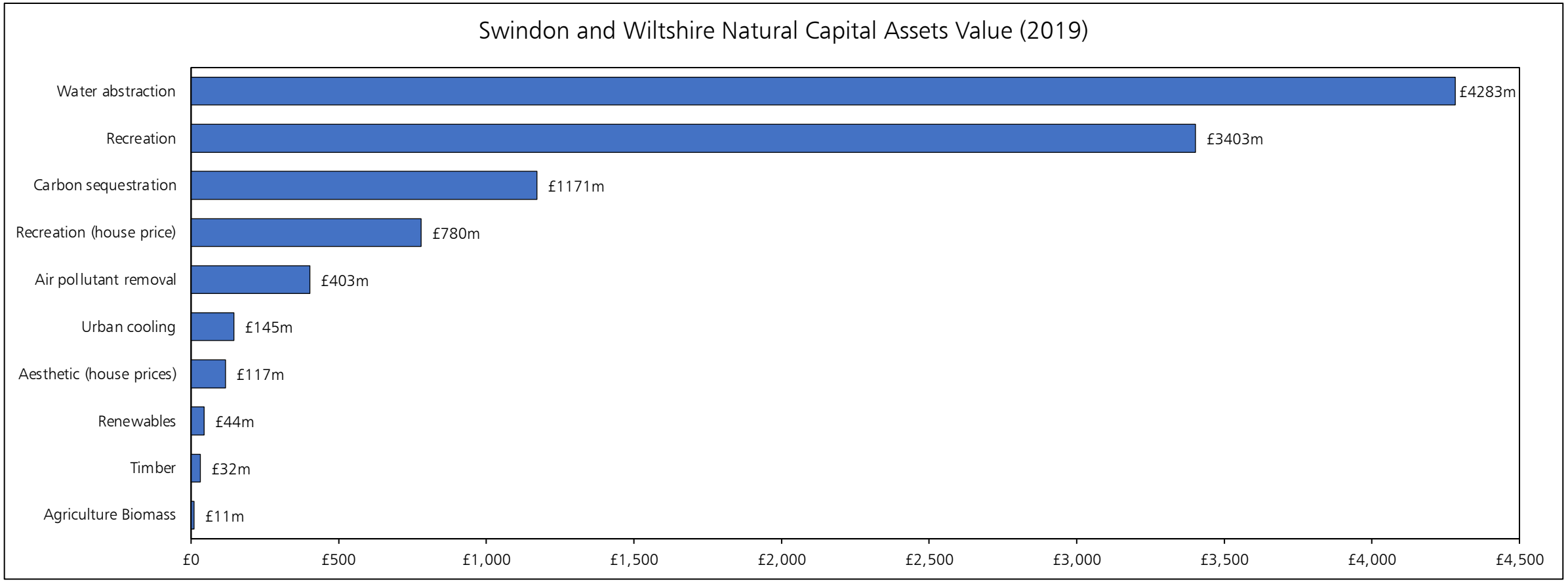
2019



	Arable and Horticulture
	Broadleaved Woodland
	Calcareous Grassland
	Coniferous Woodland
	Rough Grassland
	Freshwater
	Heather
	Heather Grassland
	Improved Grassland
	Inland Rock
	Suburban
	Urban

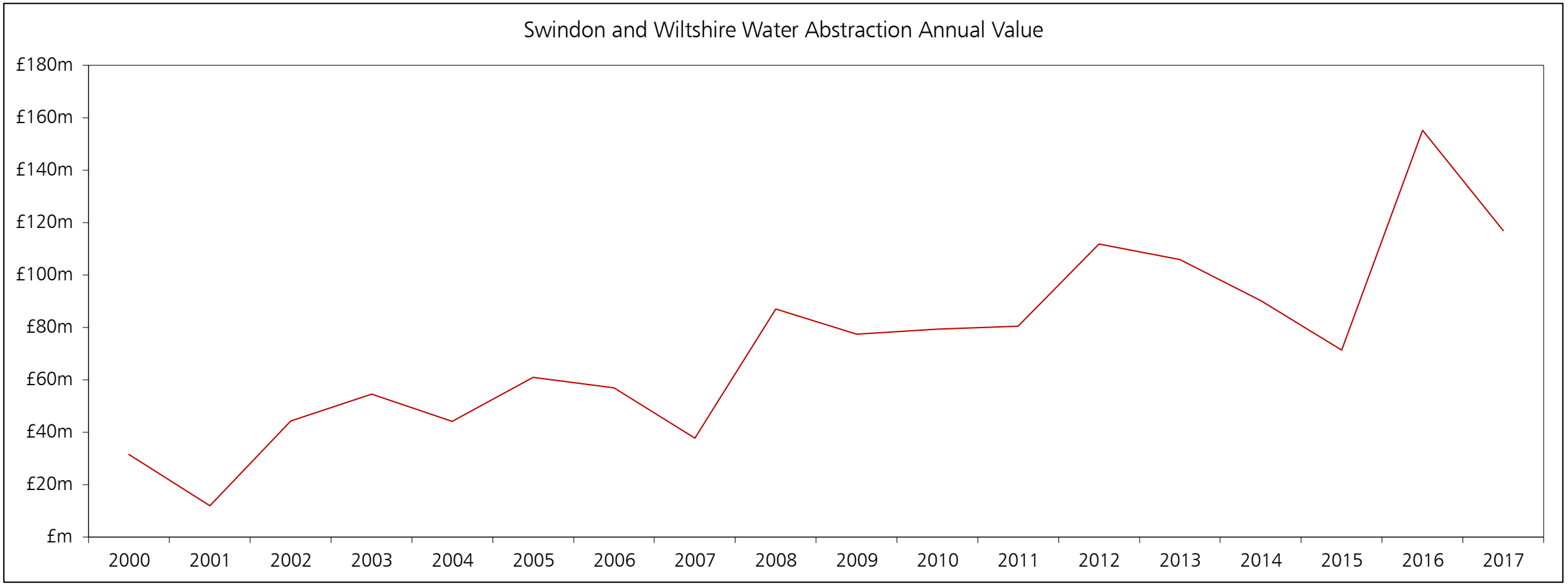
Natural capital valuation (provisional estimates)

Overall the natural capital value in Swindon and Wiltshire was around £9.6bn in 2019. This value can be broken into different components (see below), the key takeaway should be that **all these elements provide a unique benefit to the local area** to make up the total natural capital value. **While the figures are comparable they are underpinned by different methodologies and data availability.**



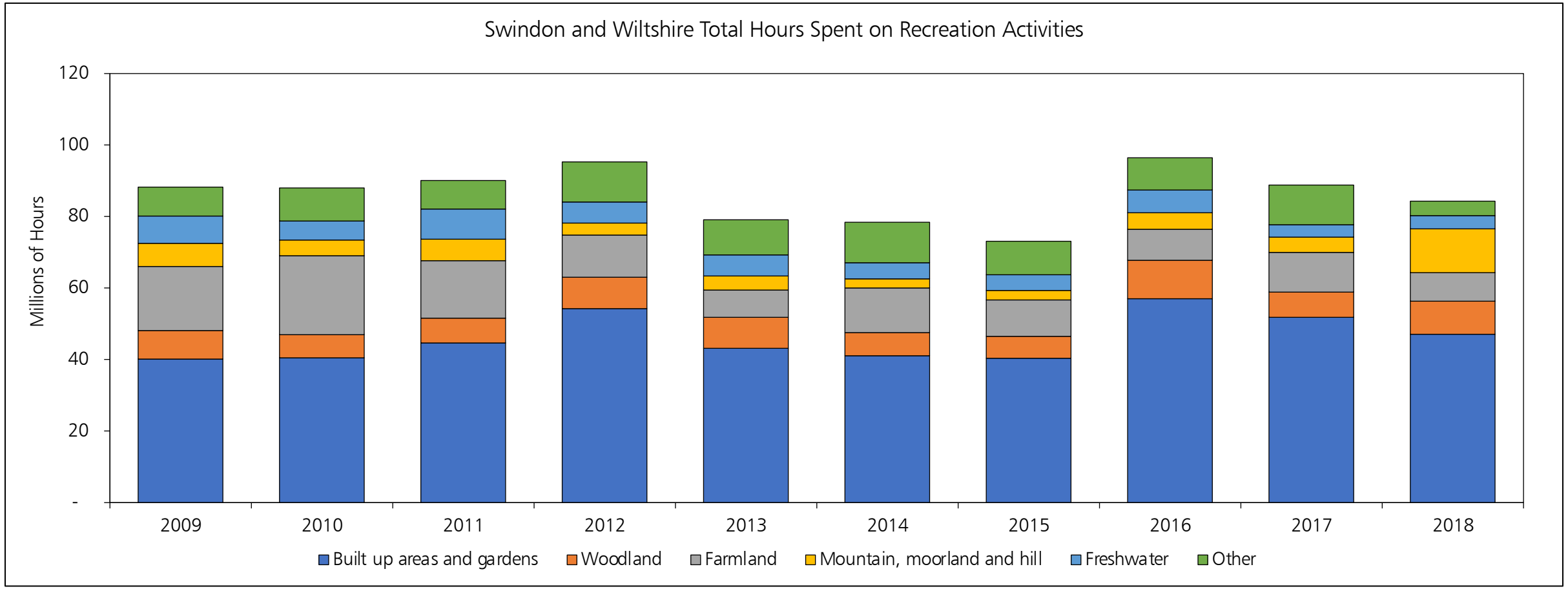
Water Abstraction

Water abstraction captures the process of extracting water from any natural source, such as a lake, aquifer, river, stream or spring. This is typically used for drinking water or irrigation. The estimated value comes from the understanding resources rents, which is calculated as the difference between the price of a commodity (i.e. water) and the average cost of extracting it.



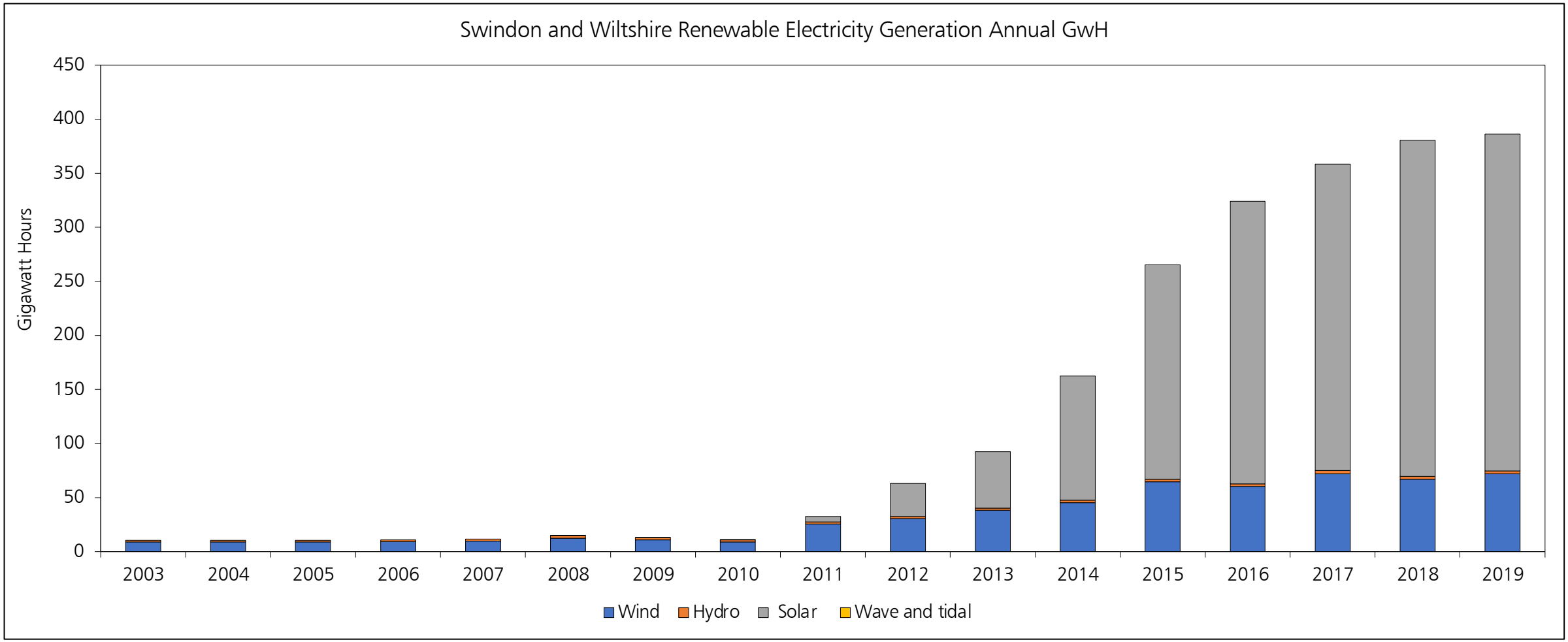
Recreation

Estimates of outdoor recreation captures people aged 16 years and over (excludes overnight and tourist visits). In the UK, around 11 billion hours were spent in the natural environment in 2018, of which around 84 million hours was estimated to be in the Swindon and Wiltshire region.



Renewable Energy Generation

Renewable energy captures electricity generated from renewable sources, wind, hydroelectric, solar, wave and tidal.



Next Steps

The work presented set the foundation of the project to build on. The next steps will involve extensions of the baseline and developing a series of layers of the model to show different aspects and factors to support the policy decision making process. The below is an illustration of what this might look like, but no final decision has been made on the layer to capture.

Layer Four – Social Economic Areas

The fourth layer extends our understanding of the beneficiaries by putting into the context the social economic make up of sub-areas with a region.

Layer Two – Natural Capital Extensions

This second layer captures the extensions to the ONS approach this project wants to develop. These are new and innovative approaches which are currently are not captured in the UK nation account such accounting for human capital or technology changes.

Layer Five (and beyond)

There is a range of options which are being scoped for added layers. The consideration is how it supports and added value in policy debates and the decision-making process.

Layer Three – Beneficiaries

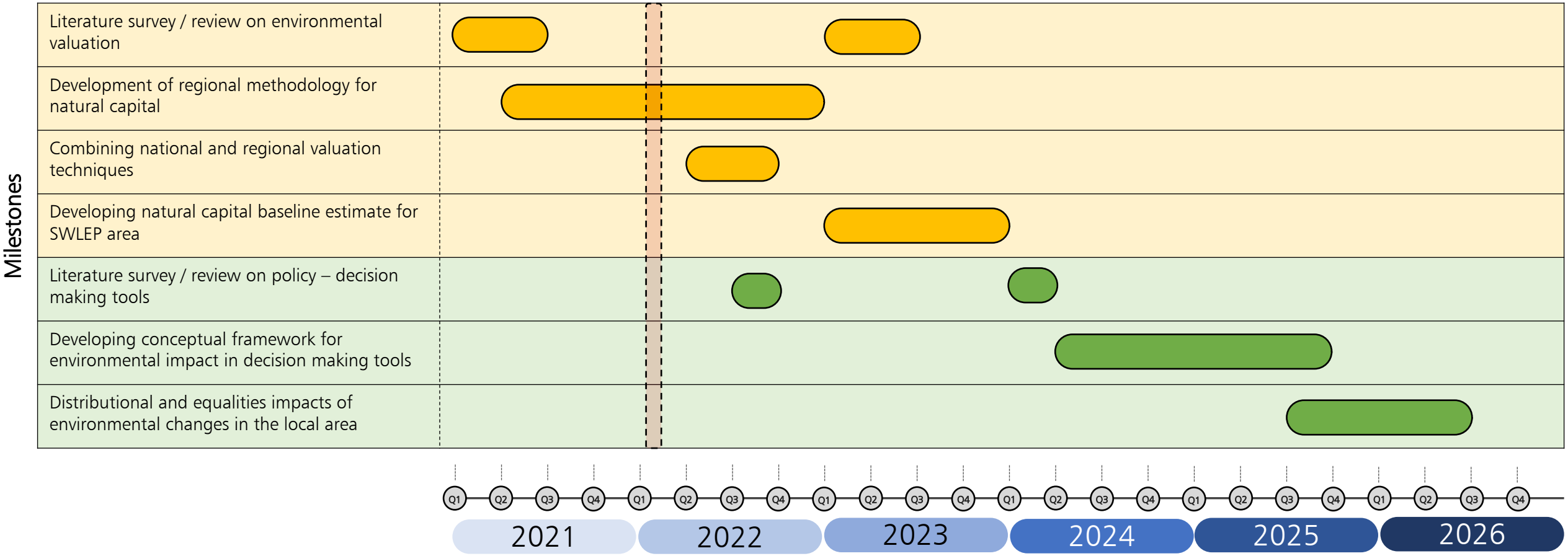
The third layer develops our understanding of who benefits from different ecosystem services, capturing the radius which certain ecosystem service can reach and who sits within that remit.

Layer One – Natural Capital Baseline

The current layer developed is the Natural Capital baseline for Swindon and Wiltshire. This layer directly adopts the ONS methodology for national UK accounts for the estimation.

PhD project milestones and timelines

Milestones and timelines relating to developing the Natural Capital baseline time series for SWLEP can be seen in Yellow section, the Green section relates to the conceptual Framework of how Natural Capital can inform local decision making.



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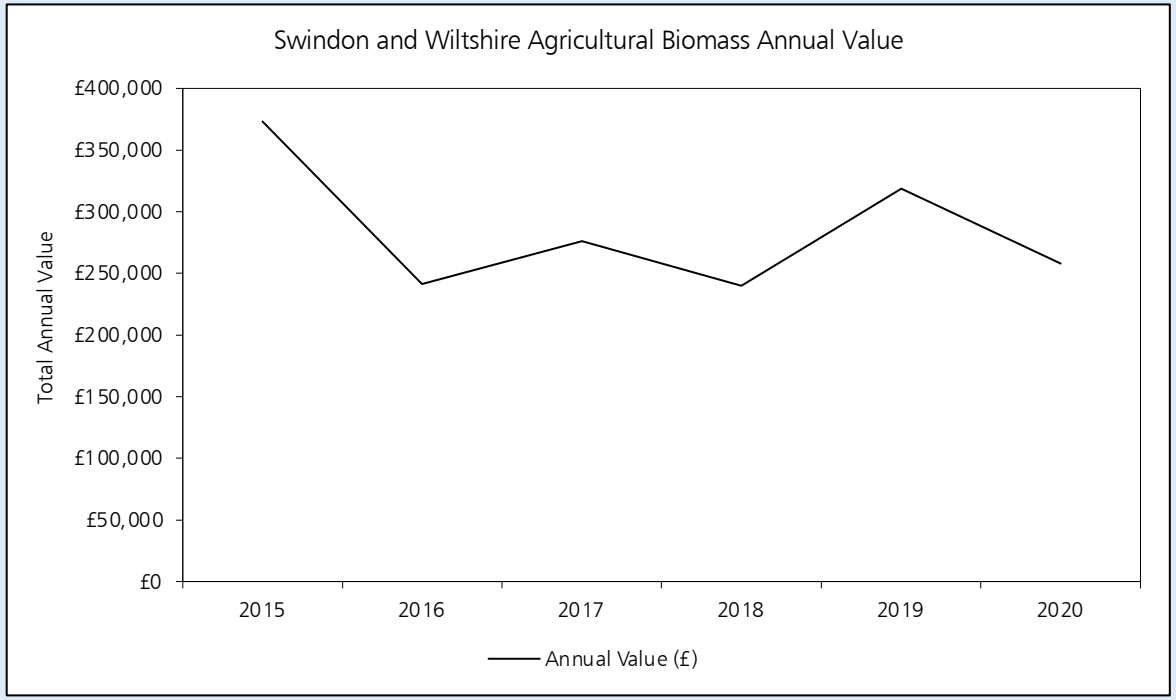
Annex

Provisioning Services (1/2)

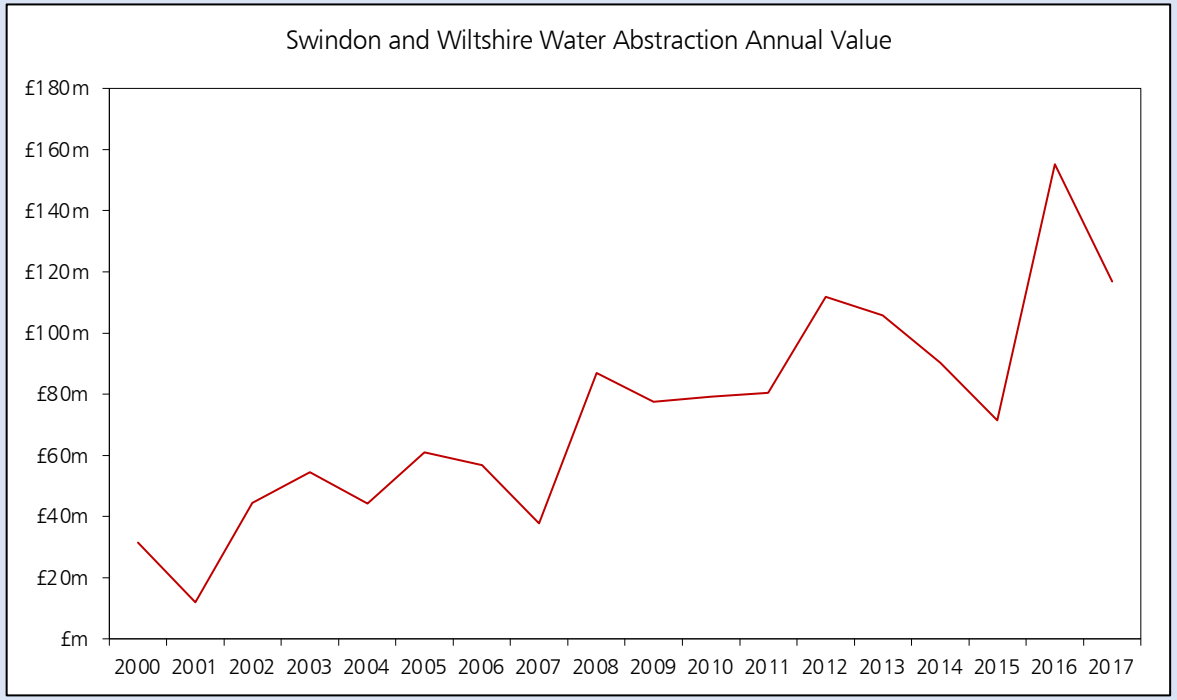
Agricultural Biomass

- Agricultural biomass includes the value of crops, fodder and grazing.
- In Swindon and Wiltshire around 84,000 hectares was utilised for agriculture in 2020. This number has slowly been declining over the observed time period, falling by 11% since 2015.
- Overall, since 2015 total utilisation of agriculture land area in the region has been declining, with the yield tonne from per hectare of harvesting land being around 15% lower now.



Water Abstraction

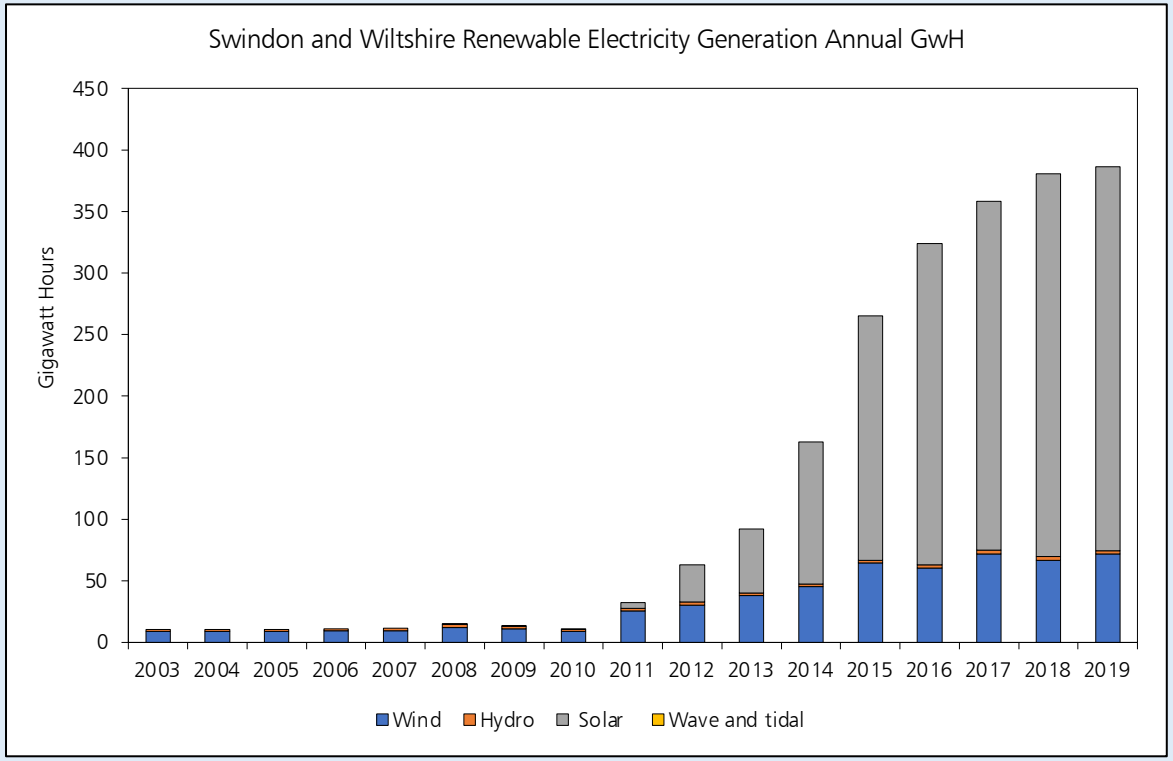
- Water abstraction captures the body of water which has been removed from any surface source.
- We can see from the figure below that the annual monetary value for water abstraction steady increased over the sample period, starting at £47.1m and reaching £121m by 2017.



Provisioning Services (2/2)

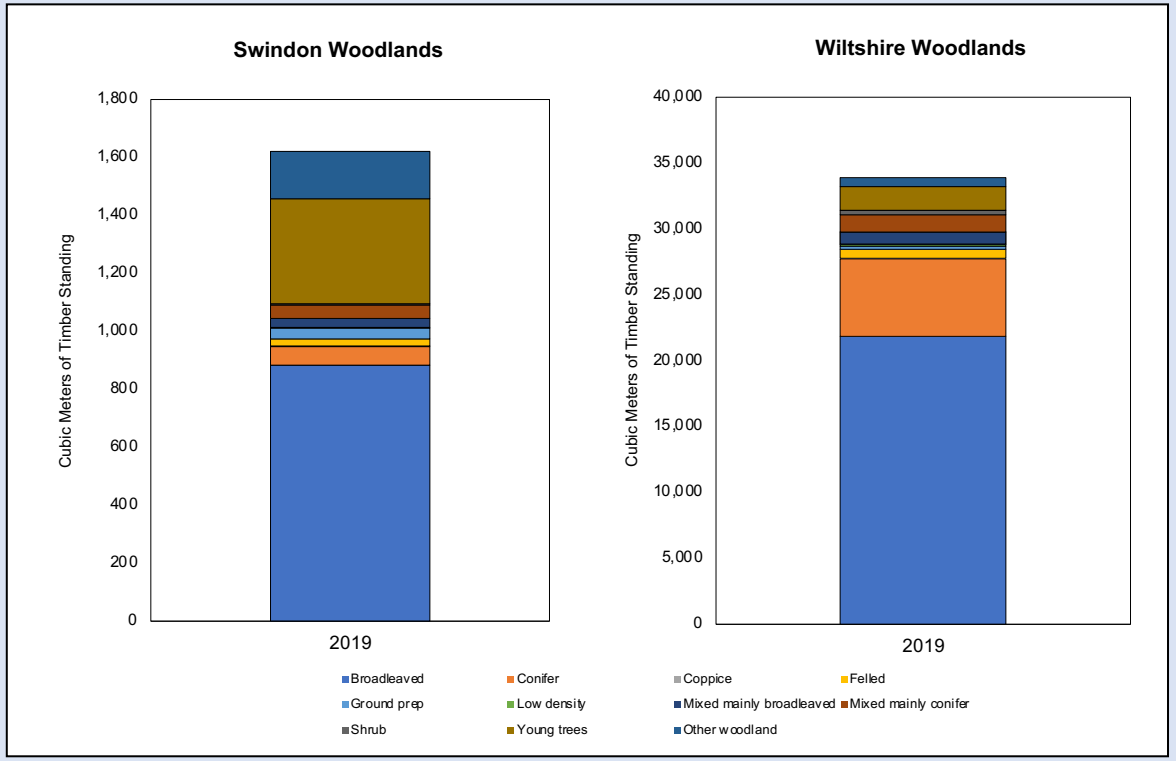
Renewable Energy Generation

- Renewable energy captures electricity generated from renewable sources, wind, hydroelectric, solar, wave and tidal.
- The annual value of renewable energy provisioning has increased by £4.2m (from £100,000) between 2003 and 2019, alongside the growth of its usage.



Timber

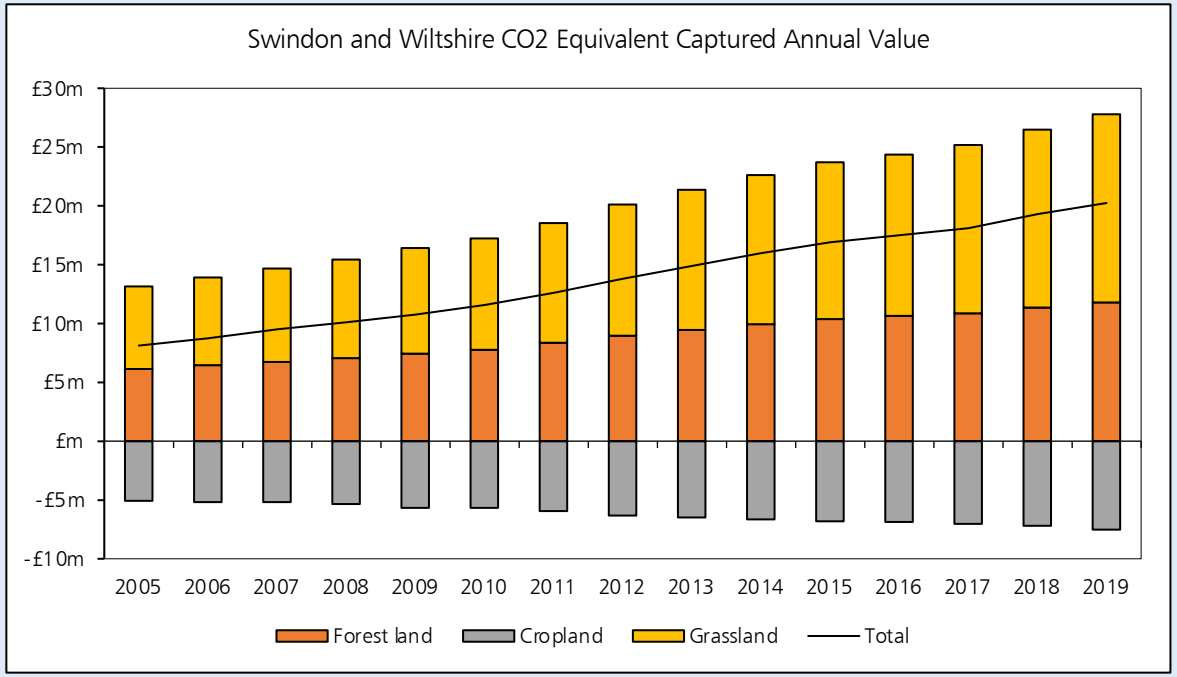
- The physical flow of timber is captured by the volume of wood (including the bark) that can be either standing or felled volume in that period.
- The total value of the timber in Swindon and Wiltshire was £1.1m in 2019. Across the UK we see the general trend of annual timber value steadily increasing over the last 10 years.



Regulating Services (1/2)

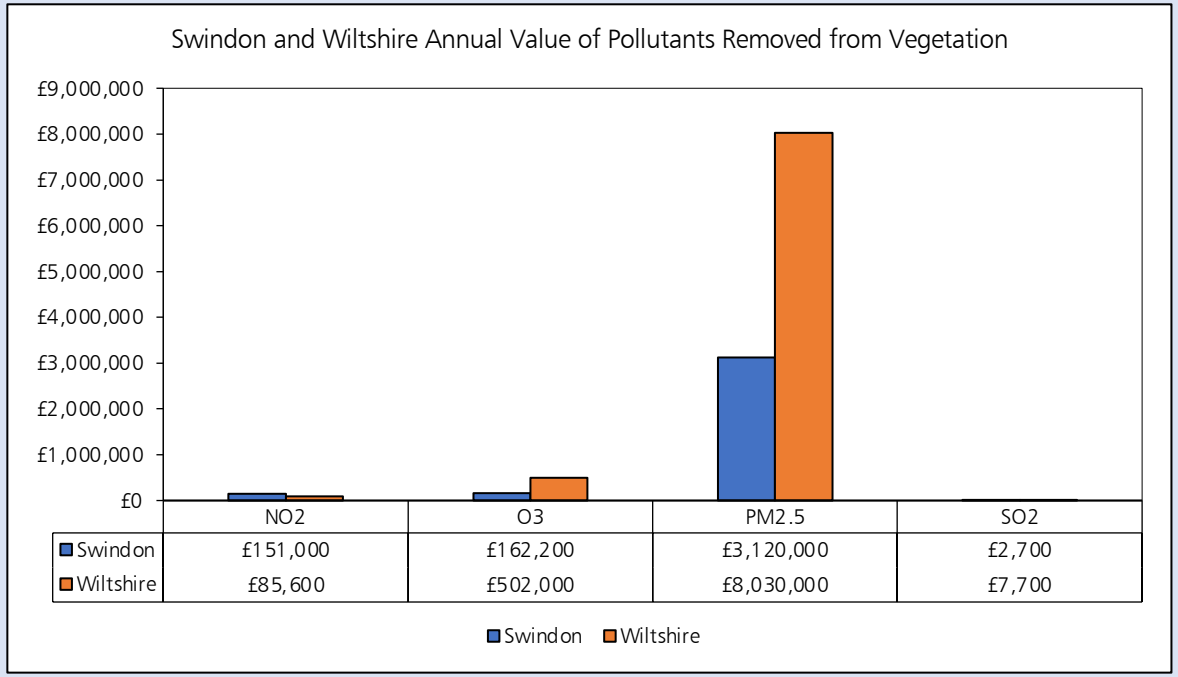
Carbon Sequestration

- Carbon sequestration shows the process the of which the natural environment captures and stores atmospheric carbon dioxide.
- Overall net carbon sequestration in the Swindon and Wiltshire area was 280,000 tonnes in 2019. With both forest land and grasslands showing to have a positive impact on carbon captured, while this was slight offset by croplands.



Air Pollution Removal by Vegetation

- Trees and other types of vegetation supports in removing pollutants (such as PM2.5, PM10 and NO2) from the air and improving air quality. This has a health benefit to society that can be valued.
- The removal of PM2.5 represents only a small amount of the total pollution removed (0.8% in Swindon and 1.5% in Wiltshire), it accounted for 90% of the avoided health impacts are the result of reductions in PM2.5 concentrations.



Regulating Services (2/2)

Urban Cooling

- Green and blue space can help in support climate regulation, these spaces include rivers, lakes and canals, can cool urban environments which benefits the economy by mitigating labour productivity loss and reducing the use of artificial cooling.
- The table below shows the number of productive days in the local economic lost due to 'hot day' if there was no urban cooling effect (these days equal to between 28 and 35 degrees Celsius). Combining these with the economic contribution of these sectors shows that total of around £2m in GVA was saved urban cooling across both Swindon and Wiltshire in 2019.

Swindon Urban Cooling

	Cooling effect (-oC)	Percentage urban area covered (%)
Woodland	-3.5	5%
Grassland	-0.7	37%
Freshwater	-0.8	1%

Wiltshire Urban Cooling

	Cooling effect (-oC)	Percentage urban area covered (%)
Woodland	-3.5	9%
Grassland	-0.7	45%
Freshwater	-0.8	0%

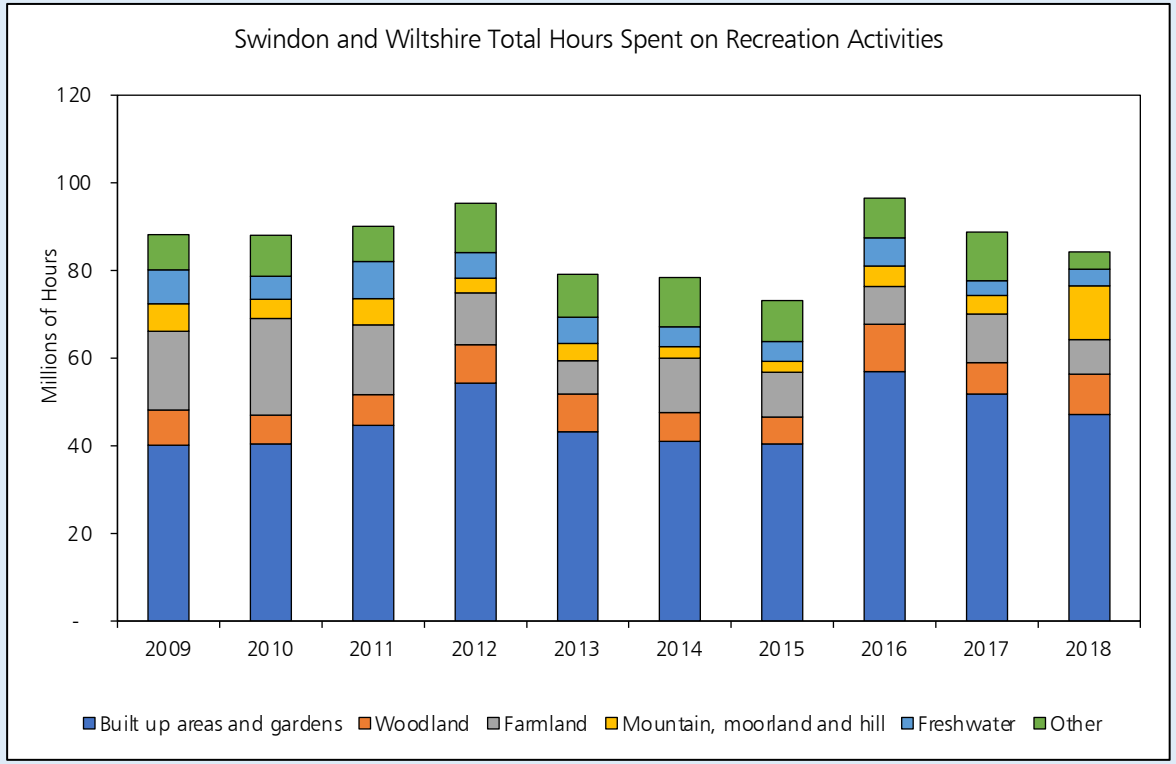
Swindon and Wiltshire Avoid Productive Days Lost from Due to Hot Days

Sector	2019	Additional in 2080
Agriculture, forestry, and fishing; mining and quarrying	0.45	0.72
Manufacturing	0.25	0.53
Construction	0.57	0.78
Wholesale and retail trade; repair of motor vehicles	0.25	0.53
Transportation and storage	0.25	0.53
Accommodation and food service activities	0.25	0.53
Information and communication	0.12	0.39
Financial and insurance activities	0.12	0.14
Real estate activities	0.12	0.39
Professional, scientific, and technical activities	0.12	0.39

Cultural Services

Recreation

- Estimates of outdoor recreation refers to people aged 16 years and over and excludes overnight and tourist visits. In the UK, around 11 billion hours were spent in the natural environment in 2018, of which around 84 million hours was estimated to be in the Swindon and Wiltshire region.



Recreation and Aesthetic Value in House Prices

- House prices are also impacted by their vicinity or access to the environment. In 2020, the recreational and aesthetic benefit of living within 500 metres of green or blue space was estimated to be worth £27m per year.