



# Including the value of nature in decision-making

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Valuing our Life Support Systems 2019, May 22<sup>nd</sup> 2019



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In the past, our failure to understand the full value of the benefits offered by the environment and cultural heritage has seen us make poor choices. We can change that by using **a natural capital approach**...This value is not captured by traditional accounting methods and is too often ignored in management and policy decisions.

**25 Year Environment Plan p19**



Pressures and Drivers of Change

Management Intervention



Ecosystem  
asset

Quantity

Quality

Location



Ecosystem  
services



Benefits



Value

Other capital inputs



**Mountains, moors and heaths**



**Semi-natural grasslands**



**Enclosed farmland**



**Woodland**



**Freshwater, wetlands and floodplains**



**Urban**



**Marine**



**Coastal margins**



## Vegetation:

- Vegetation cover/bare soil
- Type/composition
- Plant growth
- Above and below ground biomass
- Surface roughness/microtopography
- Structure
- Sphagnum cover in mires
- Primary production – biomass
- Vegetation next to water bodies
- Litter amount and structure





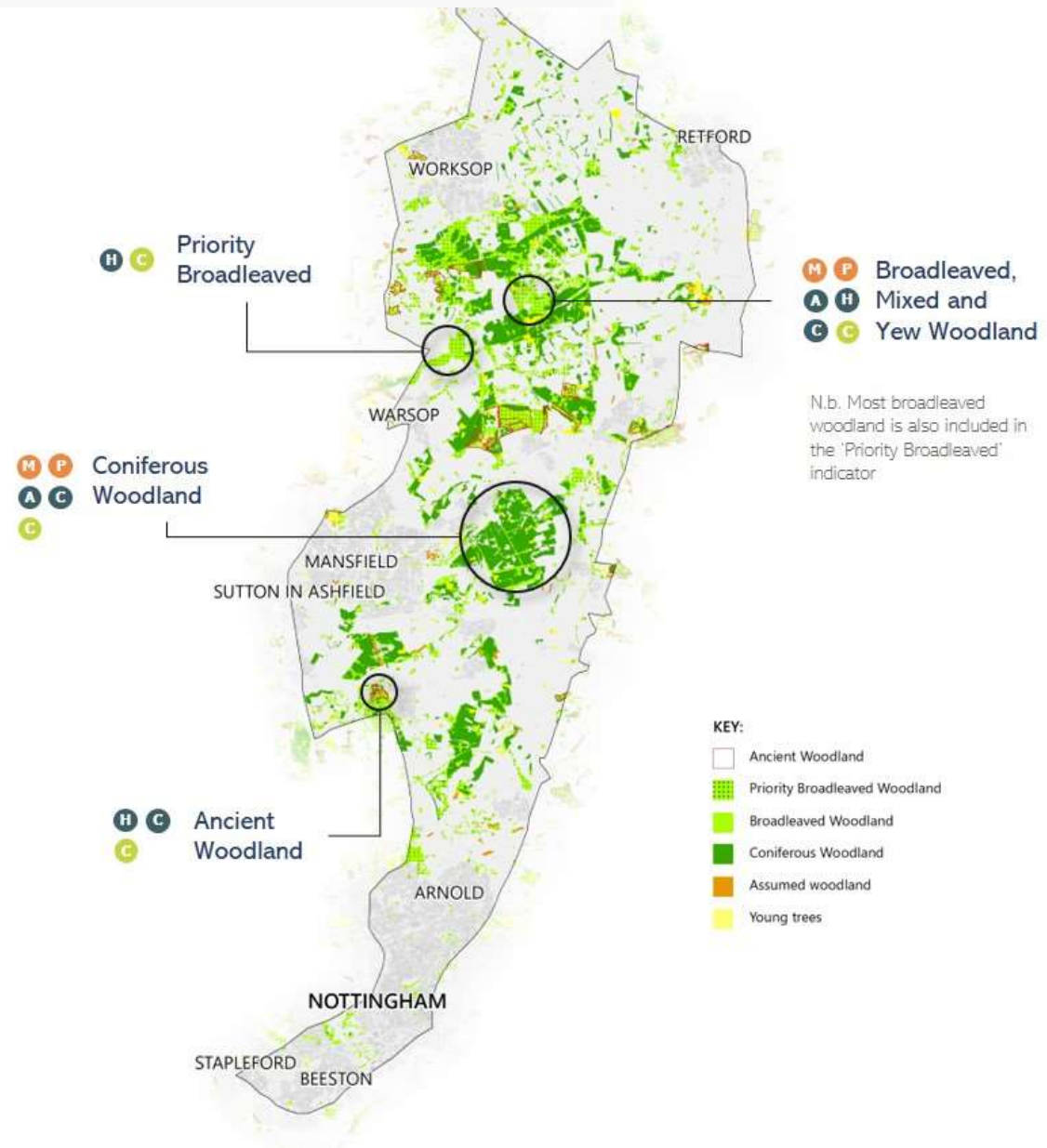
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**Ecosystem Services Key** The coloured circles denote the key ecosystem services that are associated with each indicator

- |  |   |   |
|--|---|---|
| <b>Provisioning:</b>   | <b>Regulating:</b>  | <b>Cultural:</b>  |
| <ul style="list-style-type: none"> <li><span style="color: orange;">●</span> Materials from plants, animals and algae</li> <li><span style="color: orange;">●</span> Wild animals, plants, algae and outputs</li> <li><span style="color: orange;">●</span> Plant-based energy</li> <li><span style="color: orange;">●</span> Aquaculture</li> </ul> | <ul style="list-style-type: none"> <li><span style="color: blue;">●</span> Water quality</li> <li><span style="color: blue;">●</span> Air quality</li> <li><span style="color: blue;">●</span> Noise regulation</li> <li><span style="color: green;">●</span> Mass stabilisation</li> <li><span style="color: green;">●</span> Flood protection</li> <li><span style="color: green;">●</span> Pollination and seed dispersal</li> </ul> | <ul style="list-style-type: none"> <li><span style="color: yellow;">●</span> Cultural services</li> <li><span style="color: red;">●</span> Cultivated crops</li> <li><span style="color: red;">●</span> Water supply</li> <li><span style="color: red;">●</span> Rearing animals and outputs</li> <li><span style="color: red;">●</span> Maintenance of nursery crops and habitats</li> <li><span style="color: red;">●</span> Pest and disease control</li> <li><span style="color: red;">●</span> Climate regulation</li> </ul> |

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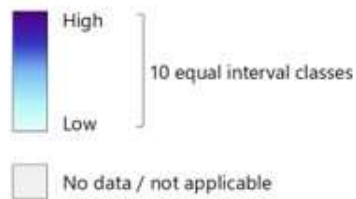
## P Presence & Frequency of Pollinator Food Plants

Pollinators are extremely important for both food production and for wildflowers. Whether managed imported bumblebees or wild pollinators, many crops in England rely on their pollination services. Furthermore, wildflowers have considerable cultural value. This map shows the distribution and abundance of nectar plants for bees.

N.b. This dataset is statistically extrapolated to a national level from CEH Countryside Survey data 2007

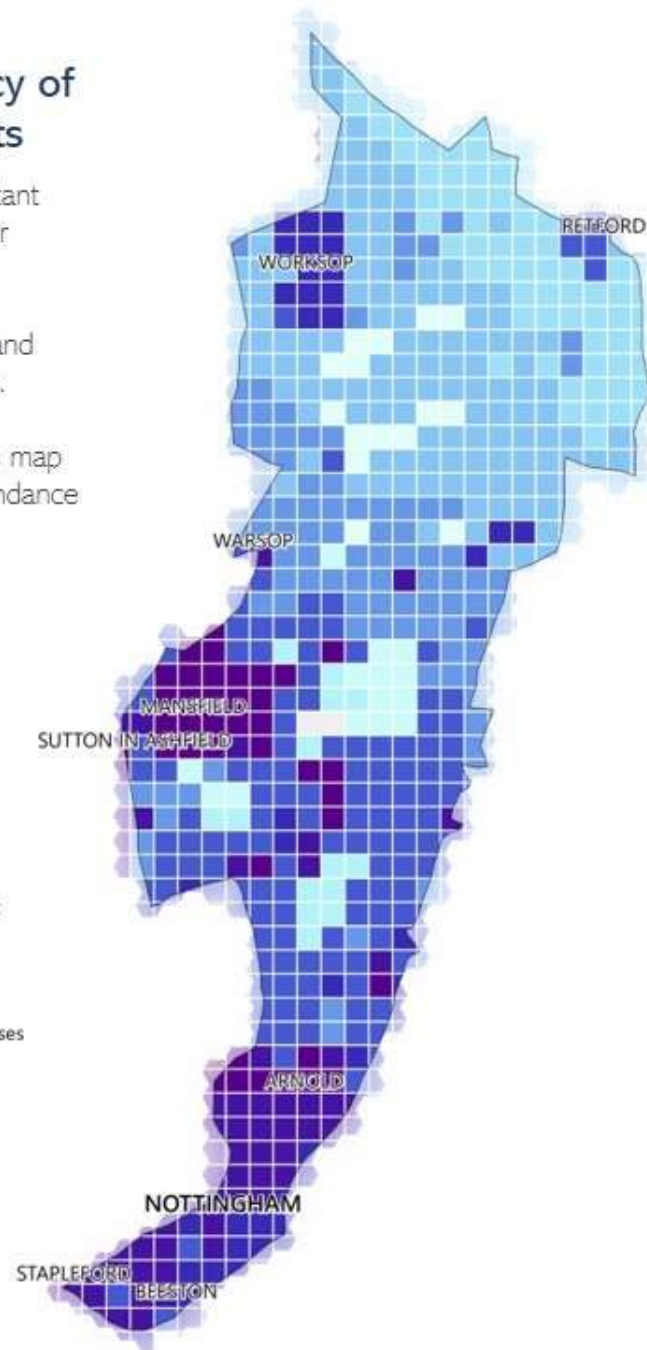
### KEY:

Mean estimates of no. of nectar plant species for bees per 2x2m plot



Low = 3.2, High = 4.7

N.b. Original data (1 km grid) displayed here



**Indicator: Mean estimates of number of nectar plant species for bees**

The map to the left shows the mean estimates of number of nectar plant species for bees per 2x2m plot for each spatial unit (hexagon).

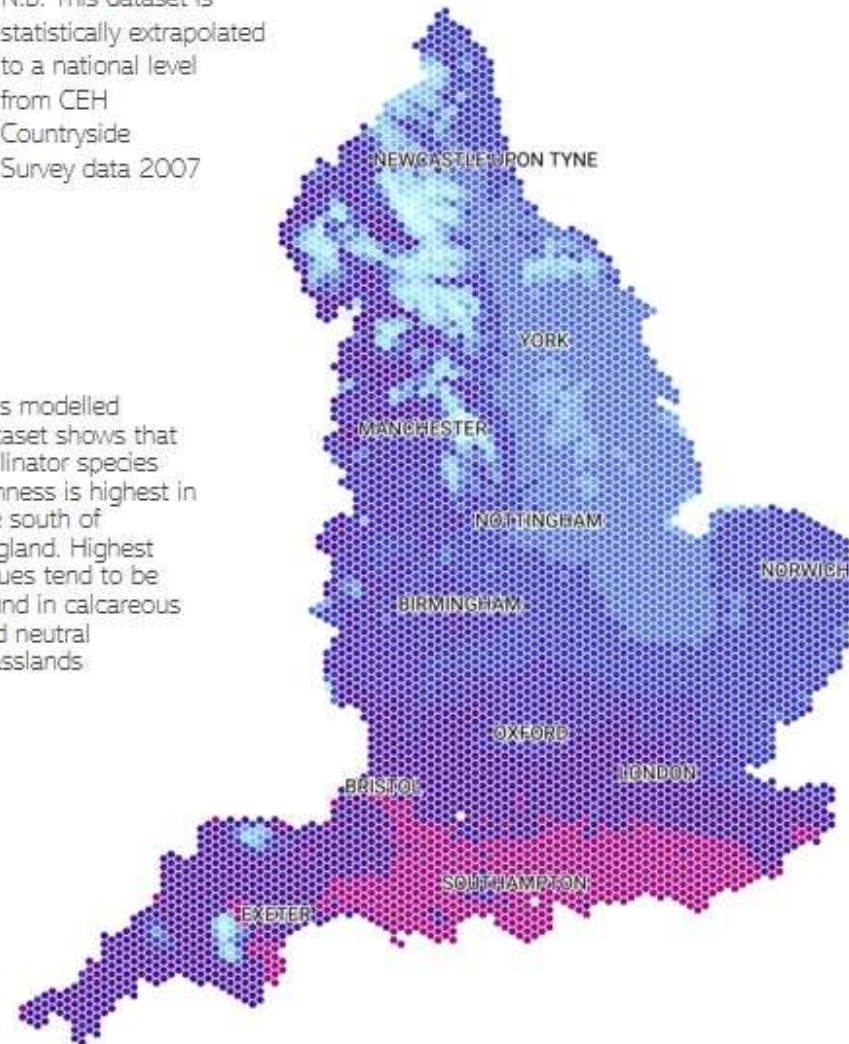
Dataset: CEH & Natural England Mapping Natural Capital project (2016) – Bee nectar plant diversity of Great Britain

## P Presence & Frequency of Pollinator Food Plants

Mean estimates of number of nectar plant species for bees per 2x2m plot, mapped using data produced from NE and CEH's 'Mapping Natural Capital' project (2016)

N.b. This dataset is statistically extrapolated to a national level from CEH Countryside Survey data 2007

This modelled dataset shows that pollinator species richness is highest in the south of England. Highest values tend to be found in calcareous and neutral grasslands.



Hexagon values: 0.78 – 6.75; Outliers: 6.75 – 9.81





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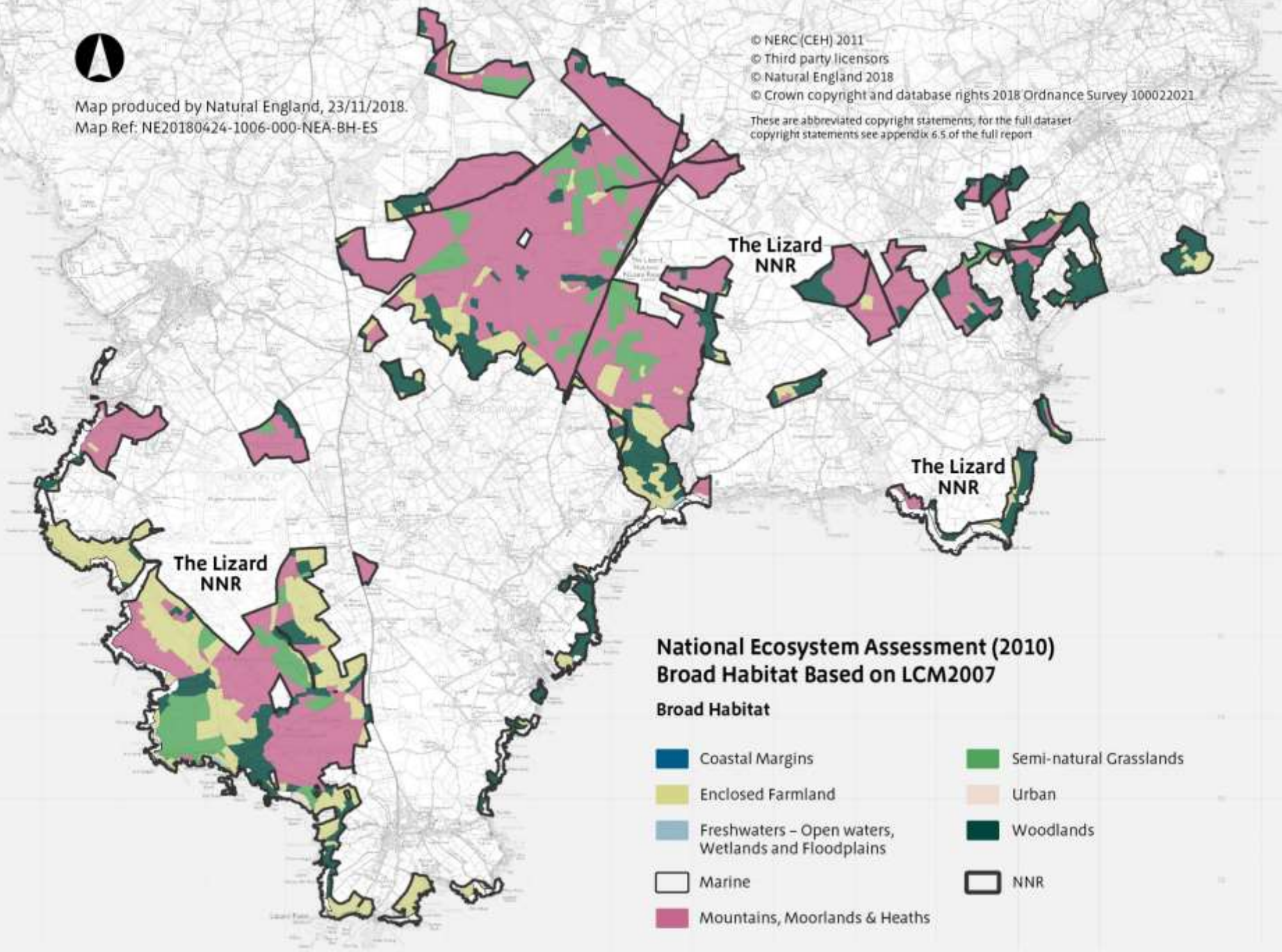




Map produced by Natural England, 23/11/2018.  
Map Ref: NE20180424-1006-000-NEA-BH-ES

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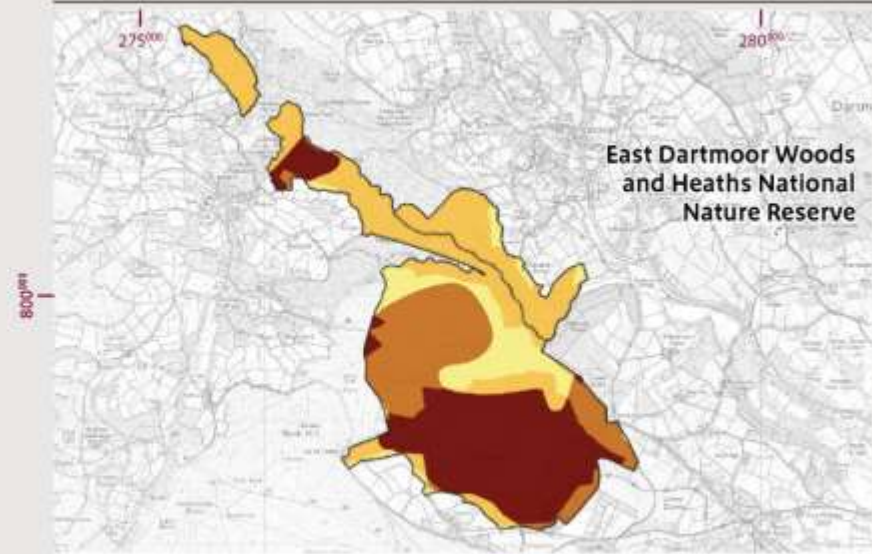


### National Ecosystem Assessment (2010) Broad Habitat Based on LCM2007

#### Broad Habitat

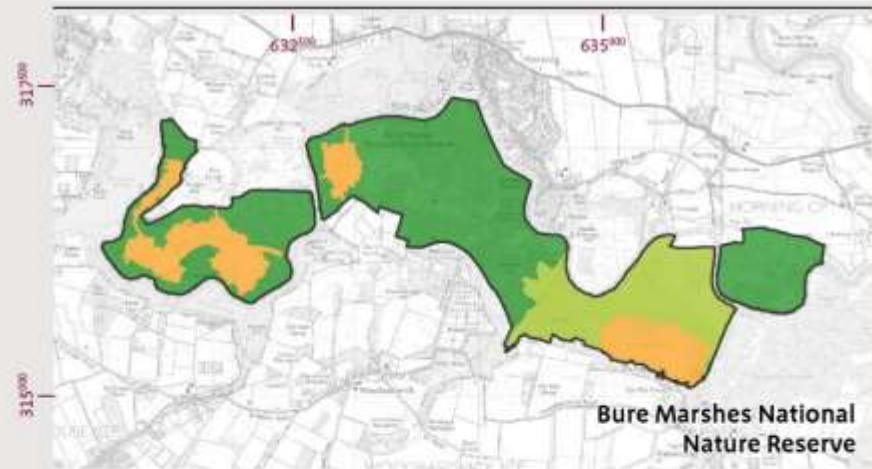
- |  |   |
|--|---|
|  Coastal Margins  |  Semi-natural Grasslands |
|  Enclosed Farmland                                      |  Urban                   |
|  Freshwaters - Open waters,<br>Wetlands and Floodplains |  Woodlands               |
|  Marine   |  NNR                     |
|  Mountains, Moorlands & Heaths                          |   |





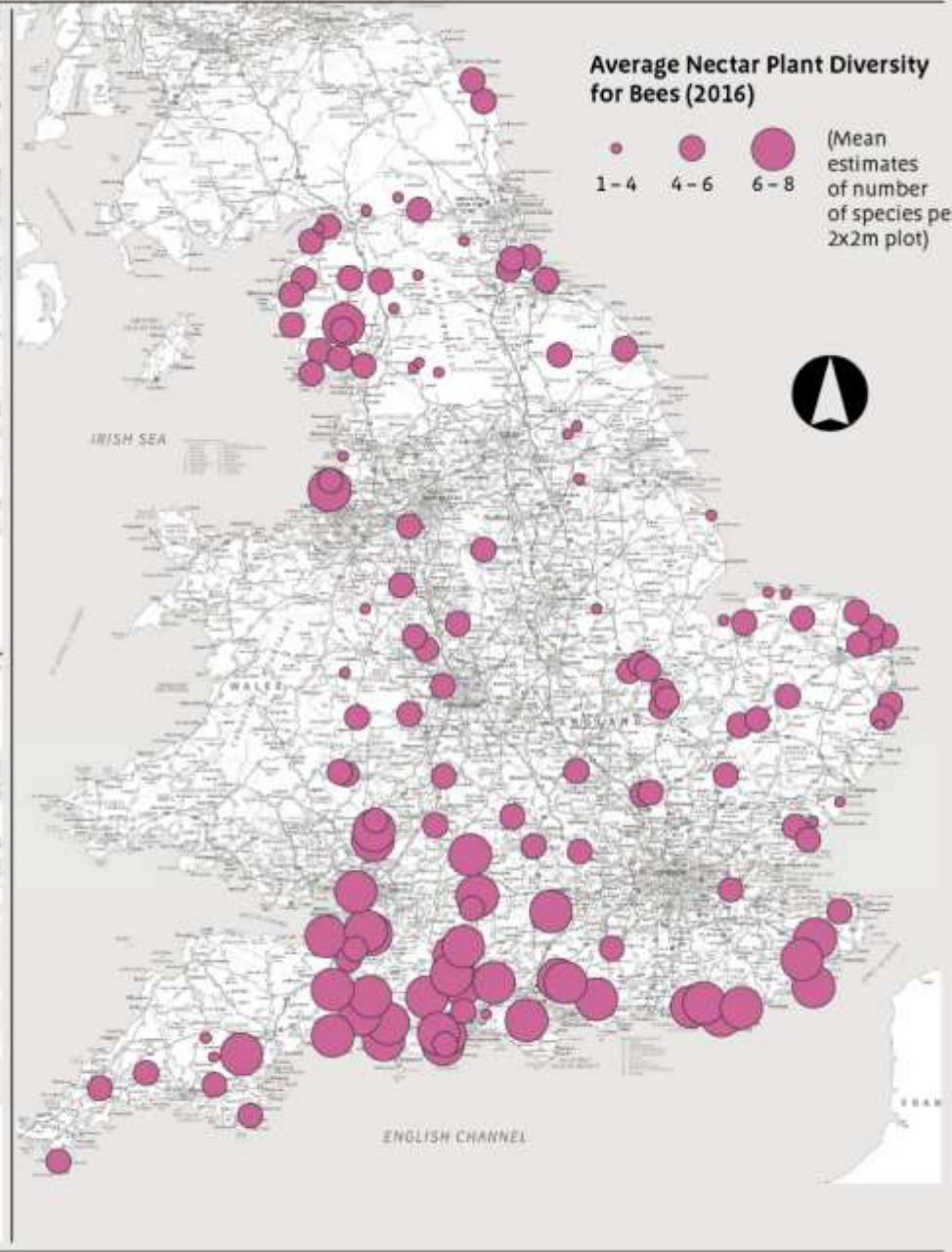
**NATMAP Carbon – Soil Organic C (2005)**

Color	% of C in topsoil
Yellow	0 – 5
Orange	5 – 10
Brown	10 – 15
Dark Brown	15 – 18.4



**Sites of Special Scientific Interest (SSSI) Condition (2018)**

Green	Favourable	Orange	Unfavourable No Change	Brown	Part Destroyed
Light Green	Unfavourable Recovering	Red	Unfavourable Declining	Black	Destroyed



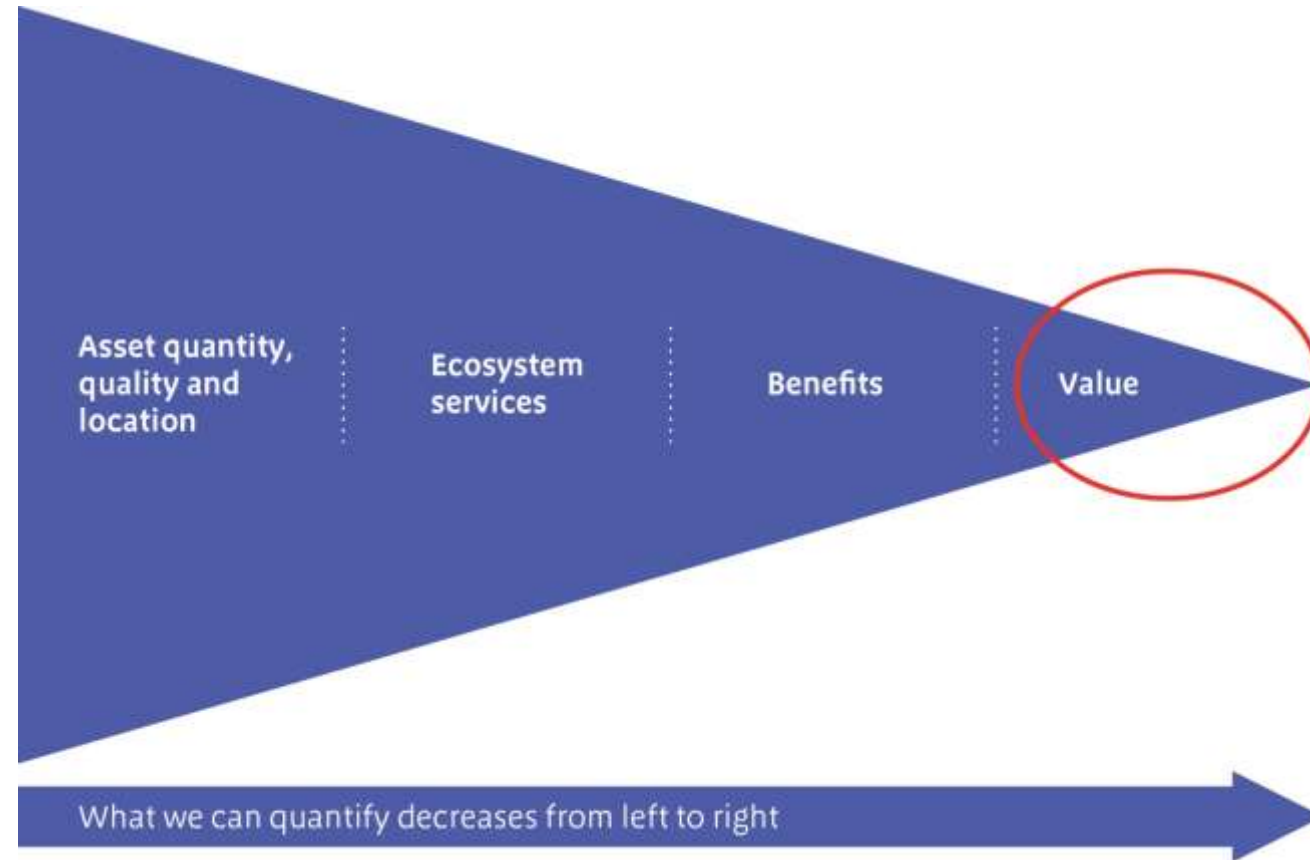
Map produced by Natural England, 23/11/2018.  
Map Ref: NE20180424-1006-000-SS-VEG-SC

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Measured value is a small proportion of true value



## Ecosystem asset

## Ecosystem services















## Benefits and values

Natural capital asset baseline			Ecosystem service	Significance (1 small to 3 large)	Indicator	Quantity where available	Benefit	Significance (1 small to 3 large)	Indicator	Annual benefit	Asset value	Confidence in the values (Red is low, Amber is Medium & Green is High)
<b>Asset Attribute</b>	<b>Indicator</b>		<b>Timber, hay and other materials</b>	2	Sale of timber	3000t	<b>Timber, wood and hay</b>	2	Sale of timber	£56,000	£2 million	<span style="color: green;">●</span>
<b>Extent</b>	<b>Total area (ha)</b>	<b>66839.7</b>	<b>Game and fish</b>	1					Income from grazing	£281,000	£9 million	<span style="color: green;">●</span>
<b>Hydrology</b>	Ground water status (% good) Water Framework Directive (WFD)	24.1	<b>Water supply</b>	1			<b>Food</b>	1	Sporting rights income	£28,000	£1 million	<span style="color: green;">●</span>
	Surface Water status (% good) WFD	18.6	<b>Livestock</b>	1								
<b>Nutrient/chemical status</b>	Mean sulphur dioxide concentration (µg m <sup>-3</sup> )	0.32	<b>Water quality</b>	1			<b>Clean and plentiful water</b>	1				
	Mean nitrogen acid deposition (kg N ha <sup>-1</sup> year <sup>-1</sup> )	12.3	<b>Air quality</b>	1			<b>Clean Air</b>	1				
<b>Soil</b>	Mean Estimates of Soil Organic Carbon in 30cm Topsoil (% of total) from NATMAP	9.13	<b>Erosion control</b>	1			<b>Protection from floods and other hazards</b>	1				
			<b>Flood protection</b>	1			<b>Pollination and pest control</b>	1				
<b>Vegetation</b>	% of NNR (ha) under a Site of Special Scientific Interest (SSSI) which is in favourable condition	51.3	<b>Pollination</b>	1			<b>Biodiversity</b>	3				
			<b>Thriving wildlife</b>	3			<b>Equable climate</b>	3	Carbon sequestered	£12 million	£1 billion	<span style="color: red;">●</span>
<b>Species composition</b>	Nectar plant diversity – Mean Estimates of Number of Nectar Plant Species for Bees (per 2x2m plot)	5.05	<b>Pest and disease control</b>	1			<b>Health</b>	2				
	Soil invertebrates Abundance – Mean Estimates of Total Abundance of Invertebrates in Topsoil (0–8cm depth soil core)	65.3	<b>Climate regulation</b>	3	Carbon Sequestered – tonnes of CO <sub>2</sub> equivalent	185,000	<b>Cultural wellbeing</b>	3	No. of recreational visits	£22 million	£710 million	<span style="color: red;">●</span>
			<b>Recreation, tourism and volunteering</b>	3	No. of recreational visits	5.5 million			No. of volunteer hours	£1.8 million	£60 million	<span style="color: red;">●</span>
				No. of volunteering hours	150,000	No. of educational visits			£123,000	£4 million	<span style="color: red;">●</span>	
<b>Cultural</b>	Tranquillity (mean score)	13.8	<b>Scientific and educational</b>	3	No. of educational visits	37,000	<b>Total quantified monetary benefits</b>			<b>£36 million</b>	<b>£1.8 billion</b>	<span style="color: red;">●</span>
	Scheduled monuments at risk (ha)	74.7	<b>Cultural appreciation of nature</b>	3			<b>Significance of unquantified benefits</b>			<b>Very large</b>		
							<b>Total annual costs</b>			<b>£14 million</b>		<span style="color: orange;">●</span>

Ecosystem service	Significance (1 small to 3 large)	Indicator	Quantity where available
Timber, hay and other materials	2	Sale of timber	3000t
Game and fish	1		
Water supply	1		
Livestock	1		
Water quality	1		
Air quality	1		
Erosion control	1		
Flood protection	1		
Pollination	1		
Thriving wildlife	3		
Pest and disease control	1		
Climate regulation	3	Carbon Sequestered – tonnes of CO <sub>2</sub> equivalent	185,000
Recreation, tourism and volunteering	3	No. of recreational visits	5.5 million
		No. of volunteering hours	150,000
Scientific and educational	3	No. of educational visits	37,000
Cultural appreciation of nature	3		



Benefit	Significance (1 small to 3 large)	Indicator	Annual benefit	Asset value	Confidence in the values (Red is low, Amber is Medium & Green is High)
Timber, wood and hay	2	Sale of timber	£56,000	£2 million	●
Food	1	Income from grazing	£281,000	£9 million	●
		Sporting rights income	£28,000	£1 million	●
Clean and plentiful water	1				
Clean Air	1				
Protection from floods and other hazards	1				
Pollination and pest control	1				
Biodiversity	3				
Equable climate	3	Carbon sequestered	£12 million 	£1 billion 	●
Health	2				
Cultural wellbeing	3	No. of recreational visits	£22 million 	£710 million 	●
		No. of volunteer hours	£1.8 million 	£60 million 	●
		No. of educational visits	£123,000 	£4 million 	●
<b>Total quantified monetary benefits</b>			<b>£36 million</b> 	<b>£1.8 billion</b> 	●
Significance of unquantified benefits			Very large		
Total annual costs			£14 million		●

<b>Biodiversity</b>	3				
<b>Equable climate</b>	3	Carbon sequestered	£12 million 	£1 billion 	
<b>Health</b>	2				
<b>Cultural wellbeing</b>	3	No. of recreational visits	£22 million 	£710 million 	
		No. of volunteer hours	£1.8 million 	£60 million 	
		No. of educational visits	£123,000 	£4 million 	
<b>Total quantified monetary benefits</b>			<b>£36 million</b> 	<b>£1.8 billion</b> 	
<b>Significance of unquantified benefits</b>			<b>Very large</b>		
<b>Total annual costs</b>			<b>£14 million</b>		

In the past, our failure to understand the full value of the benefits offered by the environment and cultural heritage has seen us make poor choices. We can change that by using **a natural capital approach**...This value is not captured by traditional accounting methods and is too often ignored in management and policy decisions.

**25 Year Environment Plan p19**



# The small influence of non-market value

## **Targets (Departmental or single-issues)**

- %SSSIs in favourable or recovering condition
- GCSE pass-rate
- A&E waiting times

## *Cost-Effectiveness Analysis*

## **Economic Growth**

- Local and National

## *Economic Impact Analysis*

## **Cost Benefit Analysis**

- Formal central government assessments



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Respecting nature's intrinsic value, and the value of all life, is critical to our mission. For this reason we safeguard cherished landscapes from economic exploitation, protect the welfare of sentient animals and strive to preserve endangered woodland and plant life...

Micheal Gove, Secretary of State , Forward to the 25 year environment plan.



The logo for Natural England, featuring the words "NATURAL ENGLAND" in white, uppercase, sans-serif font on a solid green square background.

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