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## Introduction

Over the past eighty years there has been a widespread transformation of floodplains from a naturally functioning landscape to a highly modified one. Floodplains comprise a mixture of different land uses from natural and semi-natural habitats to intensive agricultural land and urban areas. Improved land drainage and flood management schemes have allowed the use of floodplains to change substantially and the use of floodplains by intensive agriculture and urban development has expanded. Intensive agriculture covers nearly 70% of English<sup>1</sup> and Welsh floodplains, compared to just 11% for species-rich habitats, while urban areas cover 9.5%.

## Floodplain land use

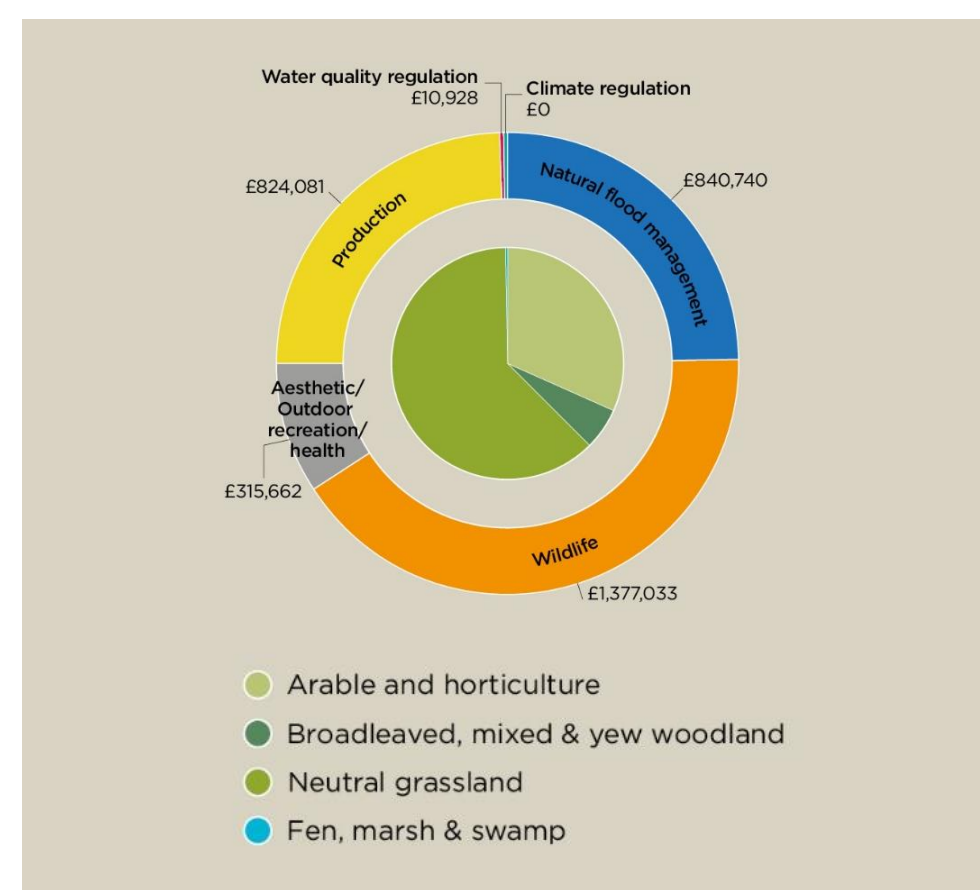


Species-rich floodplain meadow.

The benefits delivered by species rich habitats such as floodplain meadows, wet woodlands and fens are greater and more diverse than those from intensively cultivated land. Traditionally, seasonally flooded grassland provided a summer hay harvest followed by aftermath grazing. Where agricultural use was restricted by high summer water levels, wetter habitats such as fens, swamps and wet woodland would have occupied the floodplain. The dearth of such habitats in functioning floodplains reduces our resilience to floods and drought, reduces the abundance of pollinating insects and natural pest control agents, and reduces the potential for carbon sequestration and water quality improvements.

## Placing a monetary value on ecosystem goods and services in floodplains

A number of studies have attempted to value the natural capital of UK floodplains. The findings from one study, Chimney Meadows in Oxfordshire<sup>2</sup> can be seen in Figs. 2 and 3.



**Fig. 2 (left) and Fig. 3 (right): Costed benefits from a commercial farm, compared to costed benefits from the same farm when run as a nature reserve primarily composed of floodplain meadows.**

It is important to take account of all services when making decisions regarding the most appropriate and sustainable land use. This is particularly relevant to floodplains where there is such a diversity of benefit types spanning both financial and non-financial benefits.

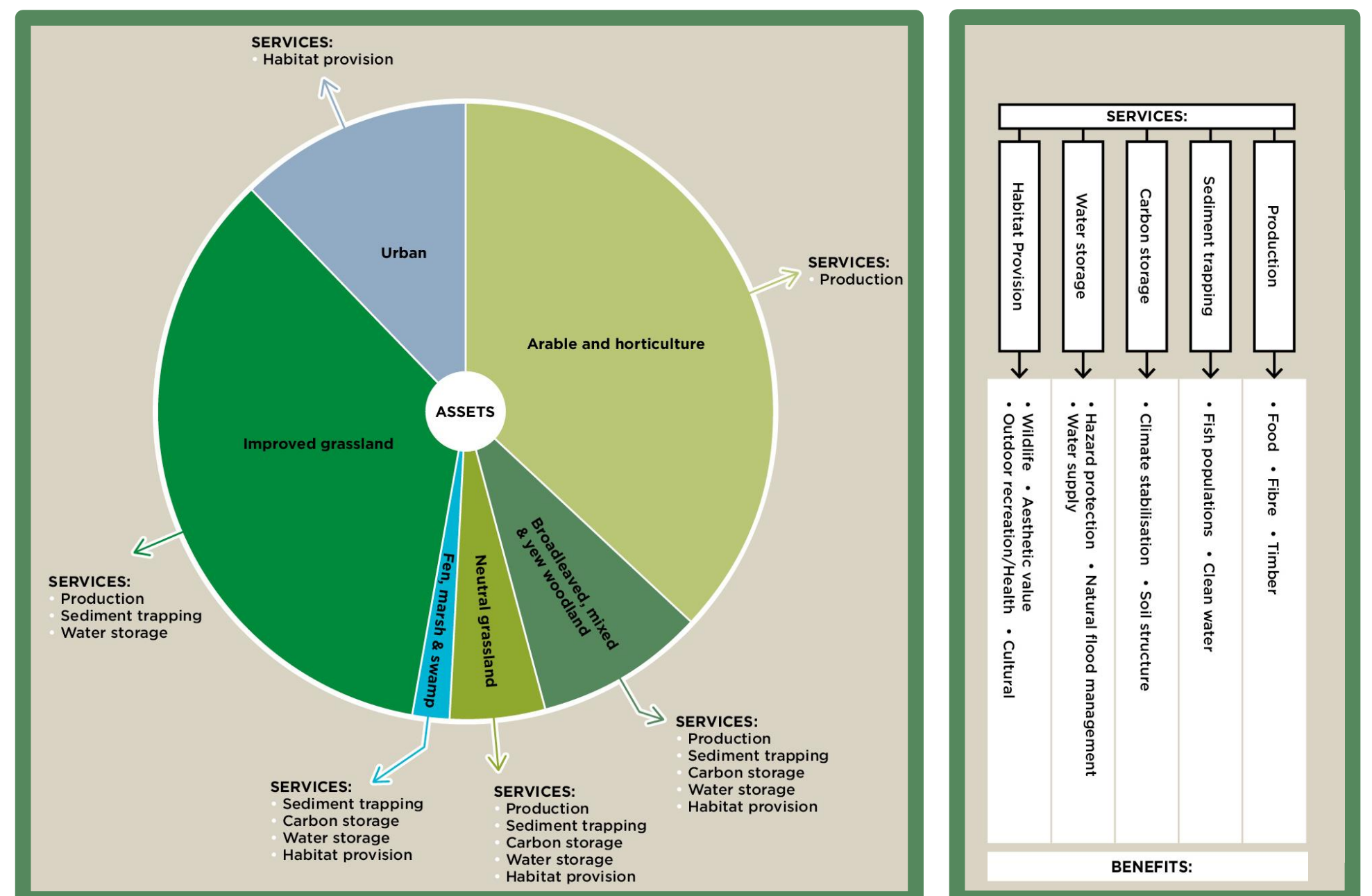
## Acknowledgements

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## The Natural Capital of Floodplains

Floodplains have important natural capital assets (Fig. 1) which deliver a wide range of services and benefits. The interface between terrestrial and freshwater ecosystems fosters a wealth and a complexity of resources that are challenging to measure and compare. We depend on floodplains for many environmental goods and services as well as food production. They have a widely recognised value in regulating flood events, as they provide essential space outside the river channel for floodwater to spread out. However, they also store carbon, support biodiversity and constitute a rich cultural resource.



**Fig. 1: Natural capital assets in English floodplains translated into services and benefits.**

## Application of principles in Government policy

The Government's 25-year plan for the Environment (2018) highlights the need to include delivery of public benefits in decision-making. The formulation of a new environmental land-management scheme will be critical in supporting landowners to manage their land differently so that it can deliver the benefits highlighted in this paper. The authors strongly recommend that a new land-management option specifically focussed on floodplains is developed as part of the forthcoming revisions to agricultural support, which should encourage:

- **Reconnection of rivers with their floodplains to allow them to flood and drain naturally;**
- **A shift of land use from intensive agricultural production to semi-natural habitats that can help to slow, store and filter water;**
- **Floodplain grassland management that promotes carbon and nutrient capture, and biodiversity supporting pollinating insects and biological control agents of pests and diseases.**

## References

1. Heritage, G. & Entwistle, NS. (2017). The impact of floodplain degradation on flooding in the UK. E-proceedings of the 37th IAHR World Congress. August 13–18, 2017, Kuala Lumpur, Malaysia
2. Hölzinger, O. & Haysom, K.A., (2017) Chimney Meadows Ecosystem Services Assessment – An assessment of how the new management of Chimney Meadows Nature Reserve by Berks, Bucks and Oxon Wildlife Trust impacts on the value of ecosystem services. Berks, Bucks and Oxon Wildlife Trust. Oxford.



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Floodplain at Oxford ©Mike Dodd

