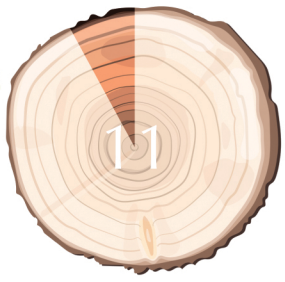
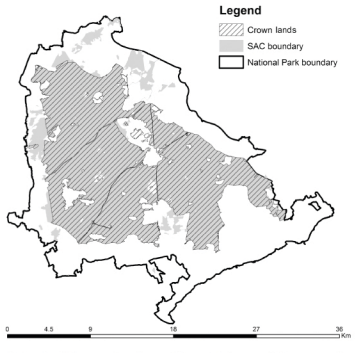
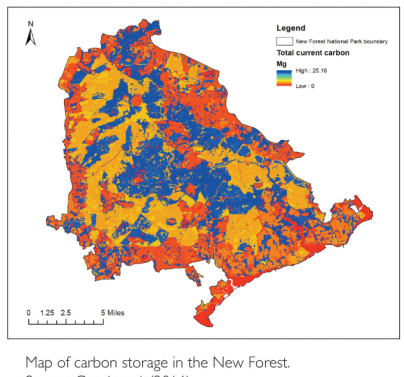


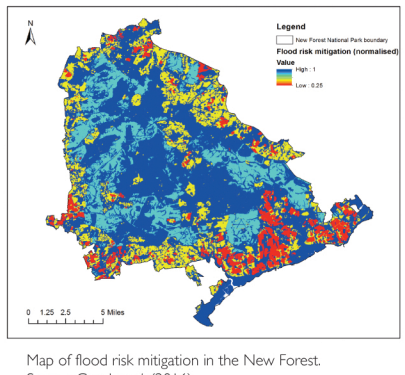
Mapping ecosystem services in the New Forest



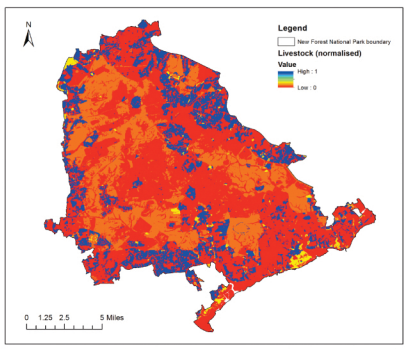
Extent of Crown lands and Special Area of Conservation in the New Forest. Source: Newton (2010).



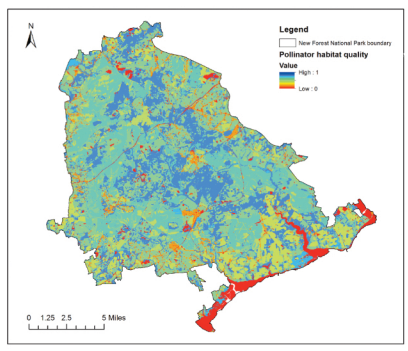
Map of carbon storage in the New Forest. Source: Gosal *et al.* (2016).



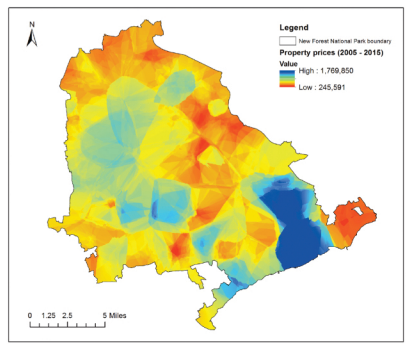
Map of flood risk mitigation in the New Forest. Source: Gosal *et al.* (2016).



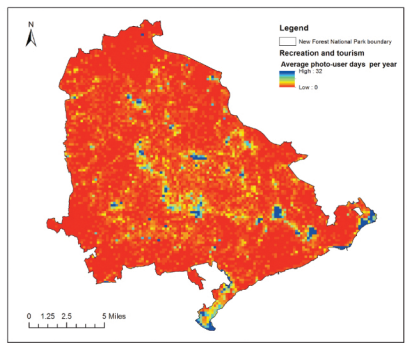
Map of livestock production potential in the New Forest. Source: Gosal *et al.* (2016).



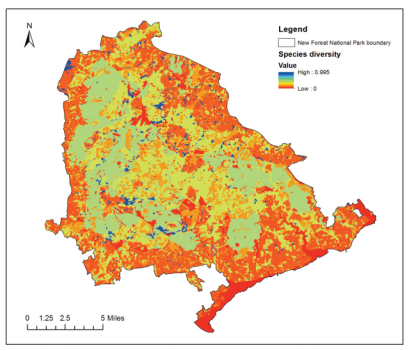
Map of pollinator habitat quality in the New Forest. Source: Gosal *et al.* (2016).



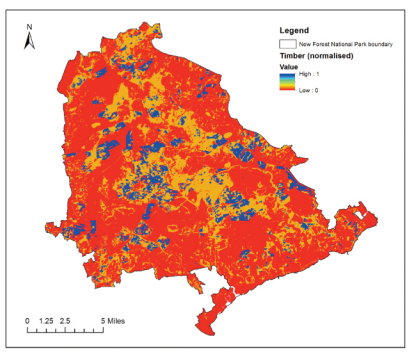
Map of property values in the New Forest. Source: Gosal *et al.* (2016).



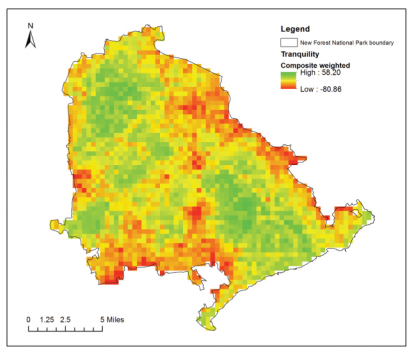
Map of recreational value in the New Forest, using number of photos uploaded to Flickr. Source: Gosal *et al.* (2016).



Map of wildlife value in the New Forest. Source: Gosal *et al.* (2016).



Map of potential timber value in the New Forest. Source: Gosal *et al.* (2016).



Map of tranquility in the New Forest, based on data provided by CPRE. Source: Gosal *et al.* (2016).

How does provision of ecosystem services vary across the New Forest?

One of the most widely used tools for mapping ecosystem services is called "InVEST", which was developed by researchers at Stanford University in the USA. The aim of InVEST is to help identify areas where investment in managing ecosystems can enhance both economic development and wildlife conservation.

We have applied InVEST to the New Forest, together with some related mapping approaches. The results provide an overview of how a range of different ecosystem services vary across the area. Such methods are inevitably associated with a degree of uncertainty, but provide a useful comparison with other approaches that we have employed in our research.

These maps highlight the value of the core area of the New Forest National Park for the provision of a range of ecosystem services. This core area constitutes the Crown lands, or the Royal Forest, over which livestock roam freely. Most of the Crown lands are also designated as a Special Area of Conservation. Our results show the value of this area for carbon storage, flood risk mitigation, pollination, tranquility and timber production, as well as wildlife. This means that any attempt to improve the condition of ecosystems in these core areas of the Park would likely increase the provision of multiple benefits to people.

InVEST uses an interesting way of assessing recreational value. The map presented here illustrates the numbers of photographs uploaded to Flickr (https://www.flickr.com/), a website developed for photo sharing. The results highlight the popularity among visitors for towns such as Beaulieu, Lyndhurst and Brockenhurst, and also coastal areas such as Hurst Castle, Lepe and Calshot. The map also shows how visitors typically move through the New Forest, by driving along the Rhinefield Ornamental Drive, which is clearly visible on the map.

Another interesting result is the map of property value. Can the value of residential property be considered as an ecosystem service? In other words, is this value related to the quality of the environment? These results show that it is. The areas of relatively high property value coincide very closely with those areas that are more rural, and more tranquil, in character. The highest property values were centred around the Beaulieu river.

These analyses also highlight some trade-offs between ecosystem services. Such trade-offs emerge when one service increases at the cost of another. In the New Forest, areas of cropland are of relatively low value for wildlife value and for pollinators, a trade-off that has been observed in many other areas. This highlights the difficulty of combining crop production with wildlife conservation.

How might the provision of these ecosystem services be affected by climate change? If woodlands decline in area or condition, this will reduce the provision of multiple benefits to people, including carbon storage, flood risk mitigation, timber value, recreation and wildlife. Climate change could also potentially affect other New Forest habitats, but the implications of this have been little researched to date.