Arable reversion and climate change: Humberhead Peatlands case study

This is one of a series of notes explaining how land management can contribute to climate change mitigation and adaptation. TIN107 *Environmental Stewardship and climate change mitigation* explains how Environmental Stewardship (ES) options can be used to reduce the scale of climate change. This note and TIN108 provide case studies highlighting different aspects of land management to address both mitigation and adaptation. These notes have been written for advisers and farmers working on ES and other environmental land management initiatives.

Background

Humberhead Peatlands National Nature Reserve (NNR) in South Yorkshire is 2,887 hectares and is the largest area of raised bog wilderness in lowland Britain. The site is a Special Area of Conservation (SAC) and a Special Protection Area (SPA).

Humberhead Peatlands NNR

Reversion of some land beside the NNR shows how land management can help the natural environment adapt to climate change.

As a condition of a planning consent for the construction of 22 wind turbines, thirty-eight hectares of intensively managed arable land next to the NNR, were reverted to wet grassland. This will:

- Increase the extent and variety of the habitats on the reserve.
- Buffer the reserve from the impacts of surrounding drainage and farming operations.
- Increase the amount of carbon stored in the soil.

First edition 04 April 2012

www.naturalengland.org.uk

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Keypoints

Adaptation

Extending the reserve, buffering the priority habitats and increasing the habitat variation should all help to improve the site's resilience to any changes in the climate.

Mitigation

Reversion of the 38 ha is estimated to sequester carbon equivalent to 63 tonnes of CO_2e per year.

What has been done?

The aim is to create suitable habitat for nightjar, hen harrier and marsh harrier by re-creating wet grassland. The restoration work has involved:

- Creating a new ditch on the outside boundary of the reversion area and installing water level control structures to allow water to be maintained at a higher level than the surrounding farmland.
- Cutting scrapes and shallow drains to provide pools and a variety of wetter conditions. The spoil being used to create ridges and further improving the range of conditions within the area.
- Establishing a grass sward through natural regeneration.

Future management will be based on extensive grazing. Weeds will be controlled as and when required and water levels and the response of indicator species will be monitored.

Natural regeneration of the grass sward

How will this help address climate change?

Adapting to climate change

A key principle for helping biodiversity adapt to climate change is to buffer high quality habitats from the impact of neighbouring sites. The re-wetting of the area adjacent to the main NNR will help protect the mire system in the reserve from the impacts of drainage in the surrounding farmland.

Another principle of biodiversity adaptation is to conserve the range and variability of habitats and species. By creating additional wet grassland habitat the variety of habitats in the area will be increased.

Habitat mosaic will help wildlife adapt to changes in climate

Within the wet grassland habitat, the mosaic provided by the scrapes, pools and ridges will enhance resilience to the effects of climate change by increasing the range of micro-climates available.

Mitigating climate change

Defra funded research estimates that the creation of wet grassland for breeding waders achieves greenhouse gas emission reductions of 5.38tCO_2e/ha/yr, through a combination of:

- reduced greenhouse gas emissions from agricultural operations; and
- increased carbon sequestration in the soil.

Over the entire 38 hectares of arable reversion the additional carbon sequestered in the soil is estimated to be equivalent to approximately 63 tonnes of CO_2 each year. This is equivalent to

planting 6 ha of woodland and is significantly more than the entire annual carbon budget for the whole NNR staff team at Humberhead Peatlands.

The process of carbon sequestration in the soil can be expected to continue over a period of decades until the soil reaches a new carbon equilibrium level. The same Defra funded research suggests that the carbon content of the soil could ultimately increase by more than 100 t CO_2e per hectare. Therefore it is important that the reversion is for the long term.

Further information

Natural England Technical Information Notes are available to download from the Natural England website: **www.naturalengland.org.uk**. In particular see:

- TIN107: *Environmental Stewardship and climate change mitigation*
- TIN108: *Planning for climate change adaptation: North Doddington Farm*
- TIN066: *Arable reversion to species-rich grassland: site selection and choice of methods*
- TIN079: *Illustrated guide to ponds and scrapes*

For further information contact the Natural England Enquiry Service on 0300 060 0863 or e-mail **enquiries@naturalengland.org.uk**.

To see how you can manage land to adapt to climate change contact Trevor Mansfield, Natural England.
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Acknowledgements

Author Trevor Mansfield. Editor Susie Smith. Photo 1 photo Peter Roworth, other photos Chris Evans.