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Wet woodand. Ickburgh, Norfolk

5. Wet woodland

Climate change sensitivity: **Medium**

Introduction

Wet woodlands experience waterlogged conditions for at least part of the year, so are sensitive to changes in climatic conditions. Many of the tree species associated with wet woodland are expected to be relatively resilient to climate change (Gosling et al 2009, NEA 2010), but the nature of impacts will depend largely on how precipitation patterns change. In many instances, wet woodland is a successional habitat that will move towards dry woodland over time, and reductions in summer rainfall and water tables are likely to hasten this process. Increases in the abstraction of water from catchments during dry periods will exacerbate the direct effects of climate change.

Much of our wet woodland has been lost or destroyed over recent decades due to clearances and land drainage for agricultural production, and it remains susceptible to changes in agricultural land use.

Increased river flooding may increase the value of wet woodland as a natural flood, erosion and water quality management tool, creating opportunities for habitat creation and retention.

Habitat Description

Wet woodland occurs on poorly drained or seasonally wet soils, usually with alder, birch and willow as the predominant tree species, but sometimes including ash, oak, and beech on the drier riparian areas. It is found on floodplains, as successional habitat on fens, mires and bogs, along streams and hill-side flushes, and in peaty hollows. These woodlands occur on a range of soil types, including nutrient-rich mineral soils and acid, nutrient-poor organic soils. The boundaries with dry woodland may be sharp or gradual and may change with time through succession, depending on the hydrological conditions and the treatment of the wood and its surrounding land. Therefore, wet woods frequently occur in a mosaic with other woodland habitat types such as mixed ash and oak woods, and with open habitats such as fens.

Many alder woods are ancient and have a long history of coppice management which has determined their structure, and in some situations it appears that this practice has maintained alder as the dominant species and impeded succession to drier woodland communities. Other wet woodland may have developed through natural succession on open wetlands (sometimes following cessation of active management) and structurally are little influenced by direct forestry management.

Notable concentrations of wet woodland on fens occur in East Anglia, Shropshire and Cheshire, while hillside and plateau alder woods are more restricted to Wales, Cumbria and western Scotland. Fragments of ancient floodplain forest are rare, and the best examples are probably in the New Forest and northern Scotland. Bog woodlands of pine on bog are confined to Scotland, but fragments of birch bog woodland occur more widely in scattered stands across the UK.

Wet woodland combines elements of other ecosystems, and as such can be important for many species groups.The high humidity favours bryophyte growth. A large number of invertebrates are associated with alder, birch and willow, including the Biodiversity Action Plan priority species, sallow guest beetle *Melanopion minimum* and jumping weevil *Rhynchaenus testaceus*. Even quite small seepages may support craneflies such as *Lipsothrix errans* and the endemic *Lipsothrix nervosa*. Dead wood within wet woodland is common, and its association with water provides specialised habitats not found in dry woodland types. The cranefly *Lipsothrix nigristigma*, for example, is associated with log jams in streams. Wet woodland provides cover and breeding sites for otters *Lutra lutra*. While few rare plant species depend on wet woodland, there may be relict species from the former open wetlands within wet woodlands, such as the marsh fern *Thelypteris palustris*.

Potential climate change impacts

Cause	Consequence	Potential Impacts
Drier summers	Drought	■ Drying out of sites reliant on rainfall could lead to a change in the dominant tree species and conversion to drier woodland habitat types. The composition of ground flora is also likely to change.
Wetter winters		■ Potential colonisation of open ground habitat in the lower reaches of catchments fed by upland headwater tributaries (Ray et al. 2010). ■ Long-term water-logging may lead to increased dominance of tree species such as alder and willow, and localised changes in ground flora and understorey composition.
Warmer winters	Fewer frost events	■ Increased survival of mammal pests such as deer and grey squirrel, resulting in more damage to thin barked trees and reduced regeneration. ■ A reduction in alder Alnus glutinosa dominance due to the impacts of Phytophthora spp (Ray et al. 2010).
Increased frequency of extreme events	Summer and winter flooding	■ An increase in the frequency of extreme floods could result in the death of older trees and the development of scrubby stands. ■ Access to sites to undertake management may become increasingly difficult. ■ More frequent extreme events could create opportunities for restoring or creating wet woodland as a flood, erosion and water quality management tool.

Adaptation responses

Rainfall is likely to be the main cause of change in wet woodlands rather than temperature. At present, there is significant uncertainty in the climate projections for precipitation. Even if the current projections of drier summers and wetter winters prove to be accurate, the overall impact on wet woodlands is uncertain.

As with other woodland habitats, there are likely to be changes in both the abundance of the habitat and the composition of species within it. In certain sites, reduced water availability will drive succession to drier woodland types such as beech and oak (especially English oak on heavier soils) or to scrub habitat, depending on soil depth, soil water holding capacity and the change in rainfall seasonality.

The management of water availability and levels will become increasingly important in catchments in the south and east of the country. The resilience of wet woodland may be increased by promoting structural and species diversity and the management of invasive species. New planting can reduce the vulnerability of existing sites though increasing patch size.

Some of the potential adaptation options for this habitat are outlined below.

- Reduce the impacts of other pressures, such as pests and diseases, pollutants, over-grazing and development pressures. Reducing deer pressure, for example, allows more natural regeneration.
- Remove sources of nutrient enrichment by increasing the area of extensively managed land around the wetland, and implementing good practice throughout the site's catchment.
- Where water supply is critical for the interest feature, consider actions that enable water tables to be artificially maintained during the spring and summer, including the use of artificial structures.
- Actively manage woodland to ensure structural heterogeneity and different age classes among canopy trees, for example through rotational coppicing.
- Accept and encourage a greater mix of native trees within the canopy.

- Monitor and address potentially harmful invasive native and non-native species. This might include the use of surveillance to detect the arrival of species at an early stage (while they can still be eradicated) and identifying potential sources of invasive species in the surrounding area.
- Promote wet woodland as potential new green infrastructure in new developments, and as part of larger wetland creation schemes.
- Where new planting is being considered:
  - prioritise areas with more secure water supply (eg spring lines or low lying areas closer to the water table) as they may represent potential refugia from the direct impacts of climate change;
  - consider the proximity to sources of invasive species when identifying locations, and avoid sites that could connect invasive pathways to areas of conservation interest;
  - give priority to making existing sites larger and reducing edge effects;
  - promote resilience through planting a range of tree species; options can be assessed using Ecological Site Classification.
- Where possible, identify opportunities to restore or create wet woodland habitats as part of flood management schemes within river floodplains.
- Take positive steps in all woodland situations to increase the proportion and diversity of decaying wood throughout sites so as to ensure both, resilience of dependant species, and the replenishment of woodland soils' organic content and hence capacity for moisture retention and provision of other essential ecological functions needed by trees and other species.

Mature wet birch, alder riparian woodland, Crathes Castle, Aberdeenshire

Relevant Environmental Stewardship options

Maintenance of woodland (HC07)

Restoration of woodland (HC08)

The aim of these options is to maintain or restore farm woodlands to benefit wildlife and protect and strengthen the local landscape character. It is only appropriate where the woodlands are part of the farmed landscape.

Priority is given to woodlands with ancient semi-natural characteristics and sites with remnants of ancient semi-natural woodland such as planted ancient woodland sites (PAWS) and grazed woodland.

Relevant English woodland grant options

The majority of woodland grants available under the English Woodland Grant Scheme closed to new applicants before April 2014. The grants outlined below, as set out in England's next Rural Development Programme document, will be available when the new scheme opens in 2015 and, in some cases during the 2014 transition period. Up to date information is available from the Forestry Commission's **Grants and Regulations** web-pages.

Woodland Infrastructure Grant (replacing the Woodfuel Woodland Improvement Grant).
This grant supports the sustainable production of wood by improving access to woodland for management and harvesting purposes. The grant will cover a proportion of the cost of work, and will not take account of the timber income that results.

Woodland Improvement Grants
Grants to fund the improvement in the quality of woodlands to achieve specific objectives, through either capital investments or five-year revenue payments. Current priorities are: bringing priority habitats into target condition; supporting priority species (particularly birds and red squirrels); PAWS restoration through gradual conversion; improving climate resilience through conversion to continuous cover approaches to management.

Woodland Regeneration Grant
Woodland Regeneration Grant (WRG) contributes to the costs of making changes to the composition of woodland within the normal cycle of felling and regeneration, under specific circumstances: following premature felling as a result of a pest or disease pest outbreak on the site; PAWS restoration following clear-fell. The objective is to support an increase in the capacity for sustainable management through this process.

Woodland creation grant
This grant provides funding for woodland creation to expand and join up existing woodland.

Woodland planning grant
Support for the drafting of a UKFS-compliant woodland management plan to promote appropriate management interventions and resilience planning.

Further information and advice

Forestry Commission (1994) Practice note **The Management of Semi-natural Woodlands 8. Wet Woodlands**.

Sussex Otters and Rivers Project **How to create and restore wet woodlands**.

JNCC (2008) UK BAP habitat description **Wet Woodland**.

Key evidence documents

Broadmeadow, M & Ray, D (2005) **Climate Change and British Woodland**. Research Note. Forestry Commission. 16pp.

Gosling, P.G., McCartan, S.A. & Peace, A.J. (2009). Seed dormancy and germination characteristics of common alder (*Alnus glutinosa L.*) indicate somecommon alder (*Alnus glutinosa L.*) indicate some potential to adapt to climate change in Britain. *Forestry* 82: 573-582.

Ray D., Morison J. & Broadmeadow, M. (2010). **Climate change: impacts and adaptation in England's woodlands** Research Note. Forestry Commission. 16pp.

Read, D.J., Freer-Smith, P.H., Morison, J.I.L., Hanley, N., West, C.C. and Snowdon, P. (eds). 2009. **Combating climate change – a role for UK forests. An assessment of the potential of the UK's trees and woodlands to mitigate and adapt to climate change**. The Stationery Office, Edinburgh.

UK Biodiversity Action Plan; Priority Habitat Descriptions. BRIG (ed. Ant Maddock) 2008.

UK National Ecosystem Assessment (2010) – **Chapter 8 Woodland**.