



State of the Welsh Countryside results from 2007

▲ Diverse Clwydian landscape • © Richard Evans

Countryside Survey is a unique study that provides evidence about many aspects of the UK countryside and how they are changing over time. During each survey, trained observers visit locations throughout the UK to record information about habitats, plants and other aspects of the environment. The first survey was carried out in 1978 and the most recent in 2007.

By comparing data collected in each survey, the gradual and subtle changes that occur in the UK countryside can be studied.

In the 2007 survey, observers in Wales visited many more locations than in previous surveys. As a result of this, Countryside Survey has for the first time been able to produce a separate set of results for Wales.



Key messages...

1. Has botanical diversity in the countryside changed?

Botanical diversity, including richness of food plants for butterfly larvae in sample plots, declined between 1990 and 2007. Non-native species were rare in the Welsh countryside in 2007 (occurring in less than one in every five sample plots) and decreased between surveys alongside the decline in native species richness. Plant species that increased between 1998 and 2007 favoured wetter conditions or tended to be taller.

2. Has the length and condition of hedges changed?

In parallel with the rest of Britain, there has been a reduction in the length of managed hedgerow in Wales over the 23 years since the first survey in 1984 and an increase in unmanaged lines of trees and shrubs.

3. Which habitats have increased or decreased in area?

The area of most habitats remained stable between 1998 and 2007 but some notable changes did occur. Built land, arable and broadleaved woodland all increased in different parts of Wales, reflecting changes in land-use. The areas of Dwarf Shrub Heath, Bog, Fen, Marsh & Swamp, and Inland Rock showed no significant change during the same period. The area of Bracken-dominated land (>95% cover) decreased by 55% between 1998 and 2007 and this was probably linked to an increase in Acid Grassland.

4. Has the condition of freshwater habitats continued to change?

The physical characteristics of headwater streams improved between 1998 and 2007 and there was no change in the nutrient status of stream communities. Streambanks have become much more overgrown since 1978 favouring reduced plant species richness but providing conditions more suitable for shade-tolerant plants. The number of ponds increased between 1998 and 2007 by 17%.

5. Have there been detectable changes in surface soil (0-15cm) characteristics?

Soil pH has progressively increased since 1978 although rate of change is slowing in many habitats. This trend is consistent with the reduction in pollution from acidic deposition.

Soil carbon concentration decreased in coniferous woodland between 1998 and 2007. No changes were detected in other habitats or for Wales as a whole. Changes in carbon concentration are important as losses could contribute to climate change.

Summary of results

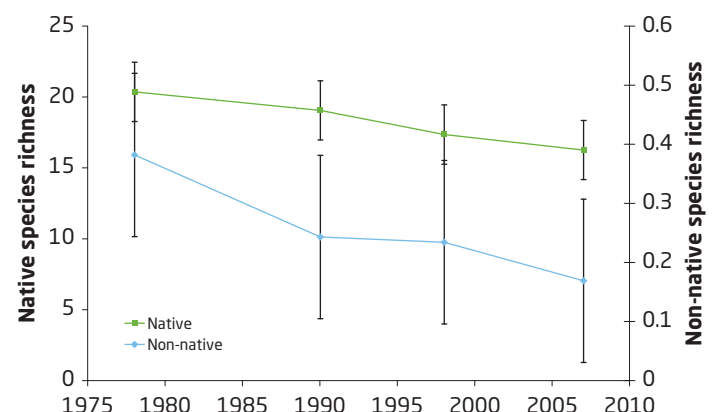
How might changes have affected the ability of landscape and habitats in Wales to cope with climate change?



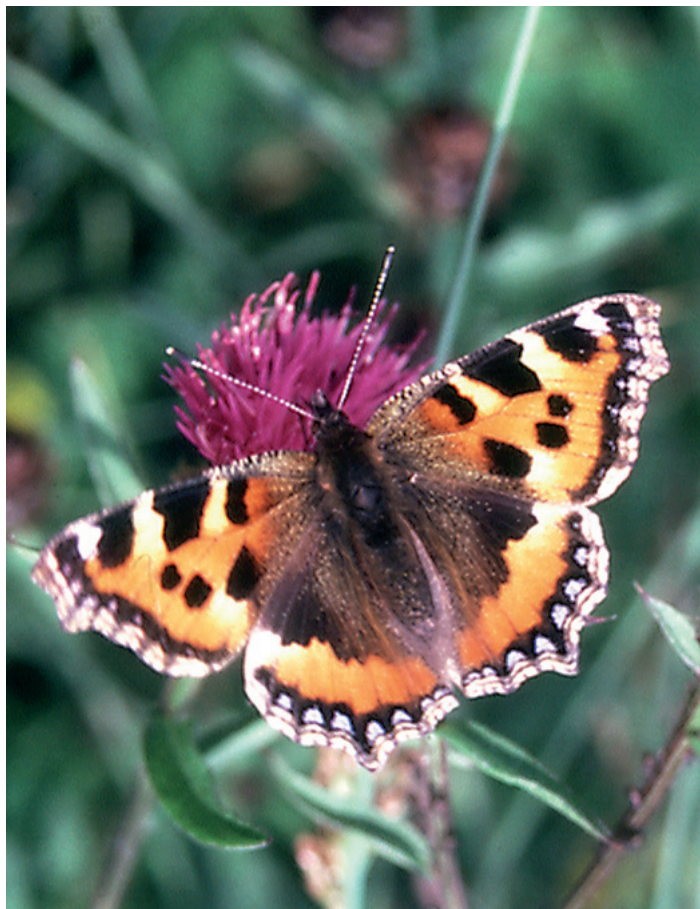
▲ Hedgerow connectivity, Powys • © C.Hurford, CCW

- Greater species diversity provides greater resilience and adaptability to environmental change. Therefore the general reduction in species diversity across Wales (**Figure 1**) could reduce the adaptive capacity of the landscape and ecosystems to respond to climate change.
- There is evidence of an increase in wooded habitat in the landscape which will have resulted in a more ecologically 'connected' landscape but only for species that can move through wooded corridors.
- While the diversity of common non-native species has declined recently (**Figure 1**), non-native species are likely to benefit from climate change. While some can pose a threat to native biodiversity, others are likely to become benign occupants of a countryside slowly adapting to warmer conditions.

▼ **Figure 1:** Changes in native and non-native species richness in all Welsh repeat plots (n=115) first sampled in 1978. Error bars are 95% Confidence Intervals on the mean counts in each survey year.



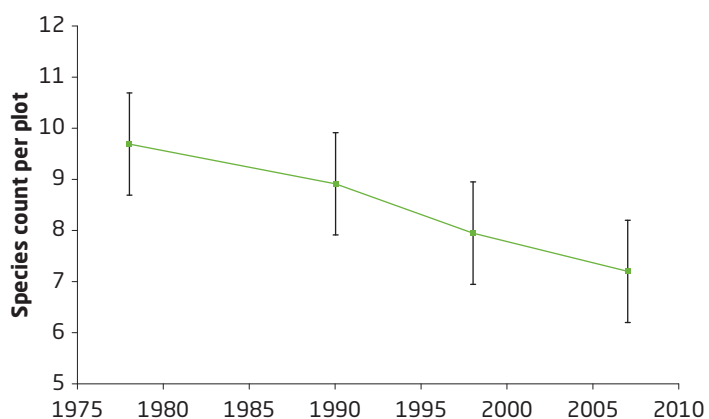
Food plants for butterfly larvae are in decline.



▲ Small Tortoiseshell • © Richard Evans

- A statistically significant reduction in butterfly larval food plant richness per plot has been seen across Wales since 1978 (**Figure 2**). The decline was especially evident in the lowlands.
- Many of the larval food plants are small flowering plants and grasses which are intolerant of high nutrient levels. Their reduction is consistent with higher fertility caused by agricultural improvement and atmospheric nitrogen deposition, as well as an increase in cover of taller shrubs and trees.

▼ **Figure 2:** Changes in count of butterfly larval food plants in all vegetation types sampled in Wales in plots that were visited in 1978, 1990, 1998 and 2007 (n=115). Error bars are 95% Confidence Intervals on the mean counts in each survey year.



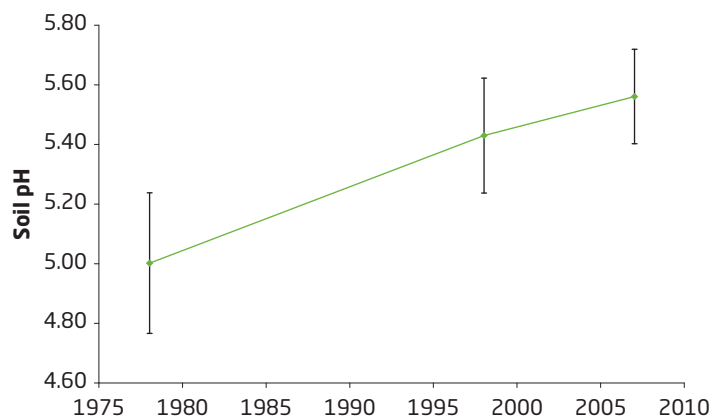
Are Welsh soils recovering from acid rain?



▲ Industrial landscape • © Richard Evans

- Since the early 1970s the atmospheric deposition of sulphur dioxide, which was a large contributor to "acid rain", has declined greatly across the UK.
- In Wales, average soil pH increased between 1978 and 2007 and stabilised between 1998 and 2007 (**Figure 3**).
- This pattern is consistent with soils recovering from the effects of acidification and is a positive sign of ecosystem recovery from earlier pollution.

▼ **Figure 3:** Change in soil pH (0-15cm) based on all Welsh samples collected in 1978, 1998 and 2007. Error bars are 95% Confidence Intervals on the mean pH in each survey year.



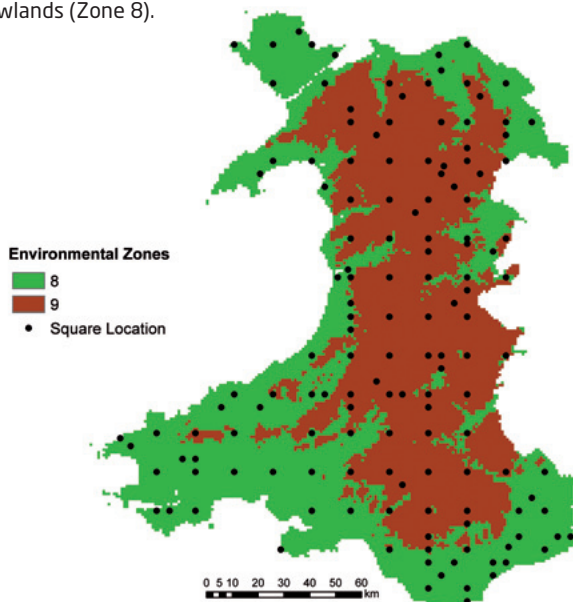
A new baseline for Wales against which to compare findings from future surveys.



▲ Field mapping • © CEH

- With devolution there is an increased need for high quality information about the state of the Welsh countryside. To achieve this goal, in 2007 the number of sample squares was increased from 64 to 107 (*Figure 4*).
- This has increased the statistical power of the sample resulting in an immediate improvement in the estimates available for 2007 and providing a baseline for more precise measurement of change between 2007 and future surveys.

▼ **Figure 4:** Countryside Survey sampling. Black dots show the location of the sample squares in 2007 (not to scale) superimposed on a division of Wales into two Environmental Zones; uplands (Zone 9) and lowlands (Zone 8).



Results in context

The expanded Countryside Survey carried out in 2007 has provided us with an improved understanding of the current state and recent change in the Welsh Countryside as well as an enhanced baseline for the detection of future change. Positive changes have been identified in the 2007 survey including an increase in the area of broadleaved woodland, an improvement in the physical condition of streams, an increase in the number of ponds, and a reduction in soil acidity in line with reduced emissions of sulphur dioxide. But these changes have taken place against a general backdrop of decreasing plant species richness, which is at odds with the aim of halting biodiversity loss.



▲ Welsh topsoil • © B. Williams, CEH

These early results from Countryside Survey have highlighted the often complex trade-offs to be made in making decisions about the management of the countryside. Often changes are neither wholly positive nor wholly negative, and one environmental benefit may only be realised at the expense of another valued resource. Future work will help us to better understand the results in relation to key challenges identified in the Environment Strategy for Wales such as climate change, degraded ecosystems, loss of biodiversity, and loss of landscape quality.



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