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Conrad, K. F. 2004. *...and it's not just at Alice Holt.* Environmental Change Network (ECN).

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appearing later than in previous decades (see Burton and Sparks 2002³).

This loss of moth defoliators may initially appear beneficial. However local decline and extinction may indicate a shift in range, the adverse affects of moth

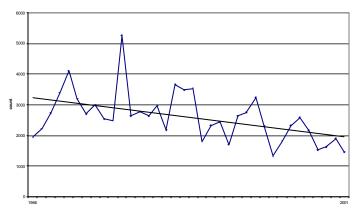


Fig. 1 Numbers of individual moths collected at Alice Holt, 1966-

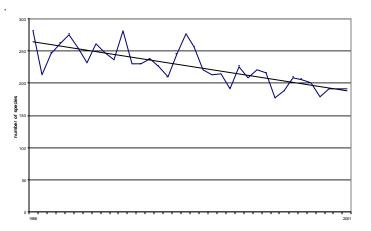


Fig. 2 Numbers of moth species collected at Alice Holt, 1966-2001

defoliation being transferred elsewhere. Migrant and alien species may colonise vacated habitats not previously available to them. Clearly this is an area for further research, and the moth data collected at ECN sites could be invaluable in understanding the possible impacts of climatic changes on moth species.

> Sue Benham and Angie Pitts Forest Research

¹See panel, right

²**Pollard, E** (1988). Temperature, rainfall and butterfly numbers. *J. App. Ecol.*, **25**, 819-828.

³Burton, JF and Sparks, TH (2002). Flying earlier in the year: The phenological responses of butterflies and moths to climate change. *British Wildlife*, June 2002, 305-311.

Forest Research web site: www.forestresearch.gov.uk

Photos © Ian Kimber. www.ukmoths.force9.co.uk

... and it's not just at Alice Holt

THE LATEST STUDY¹ of 338 moth species from the Rothamsted Insect Survey² has revealed that British moths are in serious trouble: two-thirds of common British moth species have declined over the past 35 years, with potentially devastating implications for wildlife.

Moths are good indicators of the general health of the environment, because they occupy a wide diversity of habitats and a key position near the base of the food chain for many wildlife species. This latest study suggests about a fifth of all British moths are losing numbers sharply enough to cause conservationists concern.

The study used data from the Insect Survey's nationwide network of light traps, which operates 80-100 traps annually (including 7 ECN sites). The greatest proportion of declining species is found in the southeast of the UK, while the greatest proportion of increasing species occurs in the north.

Comparing species according to their distribution, life histories and food and habitat preferences suggests declining over-winter survival, possibly due to climate change. Loss of 'less-manicured' habitats, is contributing strongly to the declines.

Most disturbingly, all of the species in the study are common moths. Rothamsted traps catch only common species in sufficient numbers for analysis, but it is common and widespread species that are displaying the most rapid declines.

> Kelvin Conrad Rothamsted Research

¹Conrad, KF, Woiwod, IP, Parsons, M, Fox, R and Warren, MS (2004). Long-term population trends in widespread British moths. *Journal of Insect Conservation.* In Press.

²Working with Butterfly Conservation and sponsored by the Esmée Fairbairn Foundation

Rothamsted Research web site:

www.rothamsted.bbsrc.ac.uk

For information on the Rothamsted Insect Survey and other long-term experiments, see: www.rothamsted.bbsrc.ac.uk/resources/ LongTermExperiments.html

Going underground

ECN precipitation chemistry data are proving invaluable in a major study of groundwater quality in England and Wales vital for the implementation of the EU Water Framework Directive. **Steve Brown** of the Environment Agency reports.

NEARLY 70% of drinking water in Europe, and 33% in England and Wales is derived from underground aquifers. However, concerns over pollution of aquifers in England and Wales from agricultural, industrial and urban sources, have been growing in recent years. In order to be certain that pollution has occurred and to be able to properly evaluate the impacts of pollution, it is first necessary to define the *baseline* chemistry of the aquifers. This is the purpose of the UK Baseline Project, the overall objective of which is to bring together and to review reliable groundwater quality information to characterise the natural water quality for representative aquifers in England and Wales. This will provide a standard reference to enable recognition of the current status of groundwater quality. Furthermore, using historical data and reference crosssections of some aquifers it will be possible to establish how natural groundwater quality may have evolved, and to what extent pollution may be impacting groundwater.

The *Baseline* project is a joint initiative between the Environment Agency of England and Wales (EA) and British Geological Survey (BGS) and will result in aquifer-

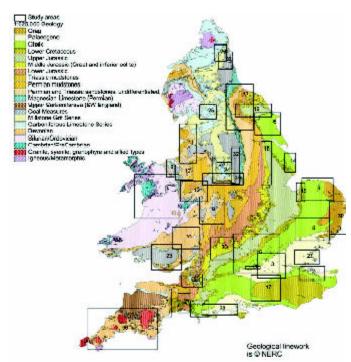


Fig. 1 UK Baseline Project study areas

Groundwater quality



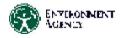
specific reports for England and Wales. The project began in 2000 and is set to continue until 2005. The study areas are shown in figure 1.

Until now there has not been a common approach, either in the UK or across Europe, to define the natural "baseline" quality of groundwater. Such a standard is needed as the scientific basis for defining natural variations in groundwater quality and whether or not anthropogenic pollution is taking place. Existing limits for drinking water quality may be breached by entirely natural processes. The implementation of new standards for groundwater to be introduced through new directives, and in particular the EU Water Framework Directive, means there is now an essential need to understand the natural quality of groundwater to enable the necessary protection, management and restoration measures for groundwater to be adopted.

Each report from the *Baseline* project will discuss how natural baseline groundwater quality has evolved in each aquifer through the geochemical processes taking place at the water-soil-rock interface and also how land-use may have impacted groundwater. Precipitation chemistry data from ECN terrestrial sites have been utilised throughout the reporting, providing very useful input data to the conceptual model of how groundwater quality has evolved. Precipitation chemistry data is of huge significance to this project as it can define the quality of infiltrating water (recharge) into an aquifer before interaction has taken place at the soil-rock interface. Rainfall provides the primary input of solutes to recharge waters and should be considered as representing minimum baseline concentrations.

This current research work into baseline groundwater quality includes the delineation of major and minor ions in groundwaters along with trace metals, organics and inorganic species and isotope composition. The completed reports will be useful tools to hydrogeologists, contaminated land specialists, researchers, consultants and other parties interested in groundwater quality.

> Steve Brown Environment Agency, Midlands Region





Geological Survey