# Annual Report on the Environmental Change Network (ECN) 2005-2006

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The Environmental Change Network (ECN) is a multi-agency, long-term research program established in 1992. Government departments and agencies sponsor the network. Environmental Research is responsible for the running of the Alice Holt site on behalf of the Forest Authority.
The need for long-term monitoring to analyse and predict environmental change was the major motivation behind it's set up. It was founded in the belief that integrated monitoring will produce a more comprehensive picture of the environment, and therefore be more likely to detect differences than considering several disconnected components. Physical, chemical and biological data are being recorded at all sites using strict protocols. Integration and analysis of these data sets will help identify environmental change and improve understanding of its causes.

## Objectives

- To provide a range of sites producing reliable uniform comparable long-term data by means of measurement at regular intervals variables identified as being of major environmental importance,

- To provide integration and analysis of these data sets to identify and improve understanding of the causes of environmental change,

- To make long-term data sets available for research and prediction of future change.

## Measurements

- Meteorology
- Precipitation Chemistry
- Atmospheric Chemistry
  - Ozone
  - Oxides of Nitrogen
  - Ammonia
  - Nitrous oxide
- Soil survey and classification data : baseline survey

- Soil characterisation and change
- Soil solution chemistry
- Vegetation
  - semi-natural
  - baseline data
  - coarse-grain (every 9 years)
  - fine grain (every 3 years)
  - woodland (tree growth and seedlings)
- Vertebrates
  - rabbits
  - deer
  - bats
  - frogs
  - birds
- Invertebrates
  - moths
  - butterflies
  - spittle bugs
  - ground beetle
  - spiders

All the protocols were carried out in accordance with the standard procedures and quality control exercises (QC). The data are submitted electronically to CEH for inclusion in the annual data digest and the summary database available on the WWW

**Data Requests/Use**

- 914 people accessed the summary database. There have been 7 individual external requests for licences to allow access to Alice Holt raw data ranging across the ECN protocols.
- The ECN butterfly data was again submitted to Butterfly Conservation for inclusion in the '*Hampshire and Isle of Wight Butterfly and Moth Report'*.
- Data was presented at the ECN Workshop held at CEH Wallingford in Sept 2006.

**Vegetation**

2005 saw the next fine grain vegetation survey with 50 plots being surveyed throughout the summer of 2005. Analysis has been completed on the vegetation data investigating changes to the understorey of Corsican pine and oak. This work was extended to include soil sampling in these vegetation plots to examine synchrony of nitrogen levels in soil and vegetation indicators. A paper is currently in draft.

**Soils**

The scheduled five-yearly soil sampling exercise was completed in 2004, with samples archived and awaiting analysis. Chemical analysis will be carried out in April 2006 by FR lab.

A student from Reading University (Ruth Fitzgerald), supervised by Mark Broadmeadow, is carrying out her PhD examining soil carbon balance and fluxes within the ECN Site using ECN data.

**Moth Data**
An article on the moth analysis carried out at Alice Holt was published in the Entomological Gazette.

**Additional research and monitoring activities**
In addition to core protocols, other ECN-related research has also been ongoing:

*Ammonia Monitoring*
Alice Holt forest as both an ECN and a Level II site is monitoring Ammonia using both alpha samplers and active denuders. The research is co-ordinated by CEH Edinburgh. The data indicate that ammonia concentrations and deposition are low, particularly for southern England.

*Pollen Monitoring*
Pollen monitoring using Tauber traps is being carried out in conjunction with Hull University as part of the European Pollen monitoring program..

*Spider Monitoring*
A new protocol for monitoring spiders caught in pitfall has been adopted.

ECN vegetation plots are being used as an unpolluted comparison to the nutrient in needle fall work being undertaken in Thetford.

*Quality Control*
ECN has QC procedures to cover all phases of monitoring and data handling. As part of these checks the analytical laboratories at Alice Holt are participating in the UK Acid Waters Network AQC programme and the Working Ring Test for deposition and soil solution sample analyses between countries participating in the ICP Forests level II monitoring program. The laboratory is scoring consistently highly for quality.

*Site managers meeting*
The annual site managers' meeting was held at Porton Down. During the meeting it was decided to stop tipulid monitoring. This has very little implication for Alice Holt as our counts were invariably zero anyway.

*Webpages*
The Alice Holt ECN web pages have been updated. Links to and from the main ECN WebPages are maintained
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**2006-2007**

Establishment of full Mensuration plot in the unthinned oak in the Target Sampling Site (TSS) was completed in January 2006. As the TSS has not been thinned for at least 20 years, it provides a valuable comparison with conventionally managed stands for assessment of biomass and timber volume. The permanent sample plot will be included within the sub-set of unthinned PSPs for evaluating the role of management.

In collaboration with FE, maintenance will be carried out to widen rides to maintain existing habitats. A general thin of half of the Straits will be carried out in accordance with M Broadmeadows directions.

Publication of Research Note reporting the rationale behind the network and summarising the data and any trends observed during the 10 years that the site has been operating. An overview of the future value of the network will also be given in the context of climate change impacts monitoring.

Possible collaboration with Cambridge University to use Alice Holt ECN site and data to calibrate there LiDAR system/method

Peer-reviewed scientific paper on vegetation changes under a chronosequence of oak stands, as detailed above.

Peer-reviewed scientific paper on soil changes over time using ECN soil data.