MEACHER LAUNCHES
£4 MILLION
SURVEY OF THE COUNTRYSIDE

On the 9th March, Environment Minister, Michael Meacher announced that the Department of Environment Transport and the Regions (DETR) and the Natural Environment Research Council (NERC) had agreed to undertake a major new survey of the British countryside.

London, Mr Meacher emphasised the importance of rural communities in sustaining the wildlife and natural beauty of the countryside. The good will of land owners was essential for the success of the survey.

Countryside Survey 2000 will provide a major overview of the habitats, plants, landscape features and land types throughout Great Britain. It will provide important information on the current state of the countryside and indicators of the changes which are happening there. The survey will have two main components:

- a field survey of broad habitats, linear features including hedges and walls, land cover, vegetation and freshwater at over 500 randomly located sites; and
- a map and database derived from satellite images showing land cover on a field by field basis across the whole country.

“This will be the most comprehensive audit of our countryside that has ever been undertaken. Countryside Survey 2000, as it is known, will repeat and extend the surveys which have been done over the last 20 years,” said Mr Meacher.

“The £4.5 million survey will establish new techniques and break new ground in the integration of field-based and satellite observation of the earth’s surface. It will provide us with essential information to help us develop our policies for the next Millennium.”

Opening the European Union Conference on Biodiversity and Sustainable Countryside in

“Countryside Survey 2000 will extend and develop previous surveys undertaken in 1978, 1984, and 1990,” said Mr Meacher. “It will provide a time-series of changes in the British countryside over the past two decades and will provide a baseline against which the effects of our policies will be measured.”

The survey is intended to help formulate countryside policies, for example, in the conservation of biodiversity in the wider countryside and protection of hedgerows. It will also be useful in assessing the environmental impacts global warming and detecting the impacts of land use change, including urban development, on the countryside.
The policy requirements for CS2000 were considered by a Scoping Study sponsored by DETR, that took place between September 1996 and March 1998. The study looked at the issues surrounding the design of the next survey and the potential outputs from the work.

The consultations during the Scoping Study took in a wide range of organisations, and as a result of these discussions it was recommended that the broad aims of CS2000 should be:

- To inform Ministers and their policy advisors of the quantitative and qualitative changes in the stock of land cover and linear landscape features since earlier countryside surveys;
- To inform Ministers and their policy advisers of the quantitative and qualitative changes in terrestrial plant species and freshwater habitats characteristic of the wider countryside;
- To establish a baseline for reporting on the status of biodiversity of broad habitats in the wider countryside;
- To develop and extend the database of countryside information established by CS1990 and earlier surveys, facilitate its dissemination to the policy and scientific communities, and to improve the understanding of the results of the surveys by non-specialists; and
- To provide rigorous scientific data to underpin indicators of the state of the environment and to help assess progress towards the achievement of sustainable development and biodiversity targets;
- To support Ministers and their Policy Advisors in understanding the significance of changes in the countryside;
- To develop and extend the links between CS2000 and other national and international survey and monitoring programmes to ensure the widest possible use of countryside survey data.

The first reports from the next survey will be in 2000. They will include the publication of:

- preliminary results on the changes in the stock of land cover and landscape features, such as hedges, since earlier countryside surveys;
- preliminary results on the changes in terrestrial plant species and freshwater habitats characteristic of the wider countryside;
- information on the stock and condition of selected Broad and Key Habitats results to contribute to the Millennium Report on Biodiversity; and,
- digital map products from the Land Cover Map 2000 Project.

It will not be possible to report on all of the different elements of CS2000 at the same time, however, and so users may expect a continuing programme of reporting and further analysis beyond 2000. In the longer term CS2000 results will contribute to:

- work on sustainable development indicators;
- general state of the environment reporting at the individual country level and, through co-ordination with the Northern Ireland Countryside Survey, for the UK as a whole;
- the assessment and monitoring of agri-environment schemes and other
Red Clover (Trifolium pratense) is a common plant indicative of unimproved grassland. Data collected in previous Countryside Surveys have shown there to have been a dramatic decline in the frequency of Red Clover and associated species eg. Birds Foot Trefoil (Lotus corniculatus) between 1978 and 1990. Countryside Survey 1990 found Red Clover to be more often associated with roadside verges than pasture.
A FIELD SURVEY

Despite the impressive progress that has been made over the last twenty years in the use of satellite data and other remote sensing to gather information about the land surface, there are some things that can only be recorded through the use of technology no more impressive than a map, a clipboard and a pencil. In particular, the detailed characteristics of vegetation and the presence of individual plant species, so meaningful in ecological terms, are best identified through field survey.

A major element of the earlier GB countryside surveys of 1978, 1984 and 1990 was a sample survey of land cover, landscape features and vegetation. By repeating these again in CS2000, an invaluable long-term data series is being established which has no equal in GB or elsewhere. The survey will take place this summer and the first results will become available early in 2000.

The aims of the field survey are to:
- estimate the extent and distribution of widespread habitats in GB;
- to characterise widespread habitats in terms of their land cover and botanical composition and to assess changes in these characteristics;
- to derive indicators of sustainable development for the wider countryside;
- to provide accessible databases containing information about the state of the British countryside;
- to provide ground reference data for the calibration and validation of ‘Land Cover Map 2000’ (see opposite).

To survey land cover in detail, within one field season, is not practicable using a census survey approach - it would take far too long and would be very expensive. To obtain cost-effective but reasonably reliable results, the field survey uses a sampling approach; the sampling unit that has been used in all countryside surveys is a 1 km square and mapping is done at a scale of 1:10,000. In CS2000, 567 squares will be surveyed. These squares are taken at random from different land types, as defined by the ITE Land Classification, and thereby represent the full range of environmental conditions in GB.

In CS1990, 506 of these squares were surveyed and the 61 new squares have been included to allow improved estimation of certain habitats (especially in the uplands of England and Wales) and to give a better sampling rate in the individual countries of GB. A separate but compatible survey of Northern Ireland is also being carried out this summer and will allow results to be expressed for the UK as a whole.

An early task is to define what is meant by widespread habitats. Since the publication of results from CS1990, the UK Biodiversity Action Plan has listed both Broad and Key Habitats. Some of these, such as lowland heath and chalk grassland, are relatively scarce and cannot be assessed accurately using the current sampling approach. Most of the Broad Habitats however are reasonably common or well distributed and it is these that are termed ‘widespread habitats’. These habitats will form the primary framework for the reporting of stock and change results from CS2000 but to provide continuity, results will also be expressed using the same classification of land cover as used in earlier surveys.

More than 60 field surveyors will be employed in the project. In each square, surveyors working in teams of two will map the land cover and landscape features (such as hedgerows, walls, woods and ponds). They will also record all the higher plants and a restricted list of lower plants from 27 vegetation plots, varying in size from 4 m² to 200 m². Each square will take up to six days to complete and the

Colin Barr
is based at ITE Merlewood and is project leader for the field survey.
Land Cover Map 2000 (LCM2000) will provide a census of the countryside of Great Britain from space. Outputs will be in the form of digital maps and databases, plus a range of derived products, held in a geographical information system (GIS). The LCM2000 will be an enhanced update of the 1990 Land Cover Map of Great Britain (LCMGB) which provided a generalised census, in the form of a grid-based map, and complemented the sample-based field detail of the Countryside Survey 1990 (CS1990). The proposed aims of the LCM2000 are:

- To undertake a survey of land cover/widespread habitat types;
- To achieve a classification accuracy of 90% for these land cover types;
- To make available a range of geographically referenced land cover products;
- To validate outputs against the field survey, report correspondence and thus guide interpretation of the two sets of results.

The most important of the various improvements will be the analysis of satellite images on a per-parcel basis. This approach, compared to classifying an arbitrary grid of pixels from which satellite images are built, corresponds more closely to the true character of much of the British landscape with its widespread subdivision into fields and semi-natural parcels.

The classification will deliver a standard list of about 18 target land cover types. These will be selected to allow assessments, as far as possible, of widespread habitat types (based on Broad Habitats of the Biodiversity Action Plan). The aim will be that more than 90% of parcels will be correctly allocated at this level of classification. Further sub-division of classes will allow greater flexibility in use. The classification will thus, for example, allow inter-conversion to the land use types of the DETR National Land Use Database. Final choice of land cover types will necessarily draw influence from LCMGB validation and its subsequent uses and also from testing in the CS2000 field training course.

The classification will be implemented via CLEVER-Mapping, a procedure which will segment Britain using the spectral data from the satellite images. Analyses within land parcels will give improved classifications and can readily incorporate contextual information, such as terrain height, soil or climate data, for further refinement of the results.

The basic outputs from the LCM2000 will comprise a vector GIS, segmenting the landscape into land parcels, and these will be labelled with the dominant land cover type and a range of other information; a grid-based GIS, similar to the LCMGB, will record dominant land cover type on a 25 m grid. This grid-based information on heterogeneity will also be attached to the parcel-based GIS. Results will become available during the year 2000.

LCMGB
- **Approach:** Raster (grid-based)
- **Image data:** Timespan three years
- **Classification:** Per-pixel classification & simple post-classification correction
- **Accuracy:** 80-85%
- **Classes:** Varying definitions
- **Outputs:** Simple gridded database

LCM2000
- **Approach:** Vector (parcel-based)
- **Image data:** Concurrent with CS2000
- **Classification:** Per-parcel classification & advanced multi-component knowledge-based correction
- **Accuracy:** 90%
- **Classes:** Consistent with CS2000 and widespread habitats
- **Outputs:** Attributed GIS database

Geoff Smith & Robin Fuller (project leader) are based at ITE Monks Wood and will be working on Land Cover Map 2000.
The launch of Countryside Survey 2000 marks the culmination of planning and consultation over the last two years. Plans for CS2000 have been developed in partnership between Department of Environment, Transport and the Regions and the Natural Environment Research Council. Negotiations are still continuing on some elements of the programme to be funded in partnership with other government departments and agencies.

Other sponsors with an interest in funding different aspects of the survey programme include: Ministry of Agriculture, Fisheries and Food; Environment Agency; Countryside Council for Wales, Scottish Office; Welsh Office; and Scottish Natural Heritage.

DETR has established a CS2000 Advisory Group and a CS2000 Joint Management Team to ensure that the Survey meets a wide range of user needs and to coordinate the work programmes funded by different sponsors.

### NEW FOCUSES

#### FIELD SURVEY

**Survey of widespread habitats and landscape features**  
(DETR, NERC)  
A sample survey of the widespread habitats, plants, landscape features and land types of the British countryside.

**Survey of freshwater habitats**  
(DETR, NERC, EA, SNH)  
A sample survey of freshwater biota, water quality and river habitats.

**Survey of agricultural key habitats**  
(MAFF; to be confirmed)  
Additional sampling of hedgerows and field margins within the farmed landscape.

**Survey of uplands in England and Wales**  
(MAFF, WO, CCW; to be confirmed)  
A new programme of work to intensify field sampling in the uplands of England and Wales and establish a baseline for future monitoring.

**Survey and analysis of soils**  
(NERC, EA; to be confirmed)  
New sampling and analysis of soils.

### EARTH OBSERVATION

**Land Cover Map 2000**  
(Consortium of NERC, DETR, MAFF, WO, SO, EA, SNH, CCW)  
A complete census of land cover and widespread habitats for GB using satellite imagery collected in the same season as the field survey.

**Airborne scanner applications**  
(DETR, NERC, EA)  
A development project to evaluate the use of airborne scanner applications (CASI and LIDAR) as a rapid and cost effective means of survey of habitats and landscape features.
**LINKS**

Environmental Change Network link  
(DETR, NERC)  
Information collected at the Environmental Change Network of sites will provide information on year-to-year variations in vegetation in between successive Countryside Surveys and the associated weather patterns.

Northern Ireland Countryside Survey link  
(DETR, NERC)  
Co-ordination between Countryside Survey 2000 and the Northern Ireland Countryside Survey will aim to produce information to common standards.

**DELIVERY**

Scientific support and information management  
(DETR, NERC)  
To design a database which will integrate aspects of the field survey and facilitate access to data to ensure the widest possible use of the information collected, including dissemination via the WWW. To provide scientific support in the application of results.

Programme coordination and policy liaison  
(DETR, NERC)  
Co-ordination of the overall work programme and liaison with policy customers, production of a summary report and discussion of results.

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**DIARY**

**1998**

**APRIL**
- First issue of the newsletter and website launch
- Training course for N Ireland survey

**MAY**
- Joint Management Team meets in Bristol
- Two week field training course for field surveyors

**JUNE**
- Start of field survey
- Summer imagery collected

**JULY**
- Start of data entry for field survey

**AUGUST**
- Land Cover Map 2000 consortium meets

**SEPTEMBER**
- End of field survey

**NOVEMBER**
- Advisory Group meets
- Issue 2 of the newsletter

**1999**
- Analysis of field survey data starts

**2000**
- Summary Report published

**2001**
- Away-day to discuss results and policy implications
- Final Report of each of the work modules published
COUNTRYSIDE SURVEY 2000
CONTRIBUTION TO NERC’S LAND USE RESEARCH STRATEGY

The countryside is changing - but how quickly, in what ways and what are the driving variables? These are the questions which have stimulated NERC's focus on land use change as a major research theme.

NERC aims to provide a research basis on which policies can be formulated for ensuring that land use in the United Kingdom is efficient, flexible and conforms to the principles of sustainable development. To realise this objective, research has been focused on the following objectives:-

i. classify land according to its capability and quality for different purposes;
ii. monitor changes in land use and quality;
iii. determine constraints on land use;
iv. identify which combinations of land use are most suitable for particular areas;
v. assess the causes of changes in land use and quality;
vi. forecast the sustainability and consequences of particular land uses;
vii. provide the basis of practices and policies which optimise the environmental, social and economic benefits of changes in land use.

Land use science is not involved in setting priorities or purposes for management and development, it is about quantitatively assessing strategies in order to suggest optimal solutions. These may be used to help reduce potential conflicts over land use, which can cross a wide range of spatial and temporal scales. These interactions between processes operating at different scales gives land use science its unique flavour and challenge.

Most of the controversial issues arising from land use change have arisen from uncertainties about the extent, scale and rate of change. In 1978, ITE scientists developed the statistical methods for monitoring land use change through a countryside survey of 500 1 km squares. In 1990 a repeat of the field survey was supplemented by the production of a UK land cover map from remote sensing. The Countryside Survey 2000 will use improved methods of data analysis and interpretation to provide a sound statistical basis for estimating the causes of, and consequences of, change over this decade.

Countryside Survey 2000 is a most challenging project; one that will dominate the activities of field ecologists and remote sensing scientists in the Centre for Ecology and Hydrology over the next 3 years. The increased frequency of field vegetation sampling and improved resolution of the remote sensing will produce information on changes in habitat quality as well as changes at the landscape scale. In the future, the challenge will be to integrate the spatial information on land use change, with dynamic process models to predict the consequences for wildlife, soil and water quality.

Mike Roberts
is the Director of ITE