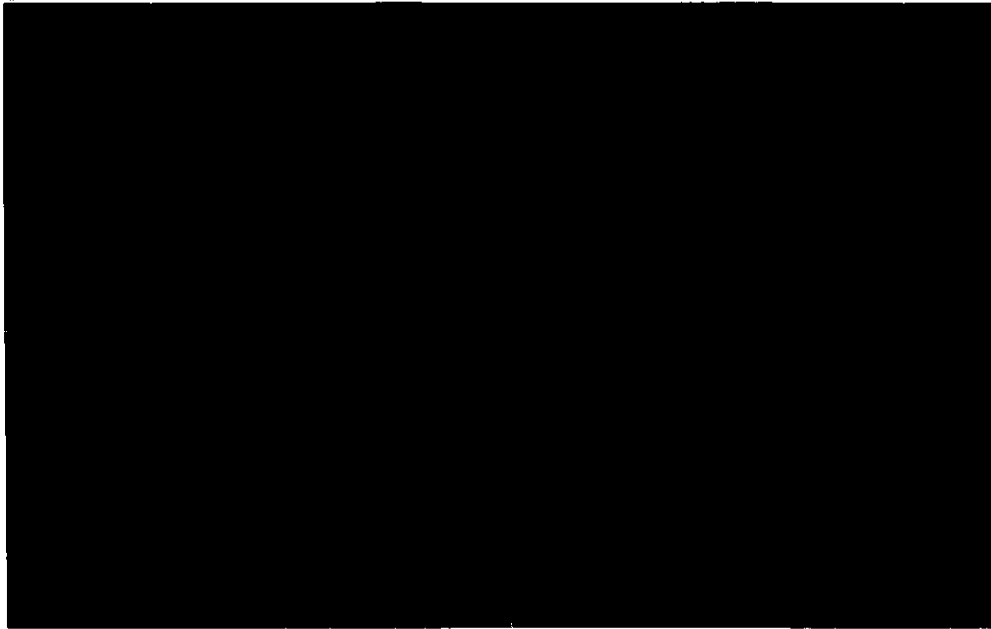


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**Centre for
Ecology &
Hydrology**



CENTRE OF ECOLOGY AND HYDROLOGY

MASQ: MONITORING AND ASSESSING SOIL QUALITY

NERC/DETR/EA funded : CEH Project Number C01229

Module 6: Soils and Pollution

Progress Report 7

November 2000

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1. Work Programme

- ◆ Development and population of the database for soil acidity and loss-on-ignition, and associated supporting data.
- ◆ Laboratory examination of soil fauna and microbiology
- ◆ Analysis of heavy metals and organic compounds

A timetable for the work programme is presented in Table 1.

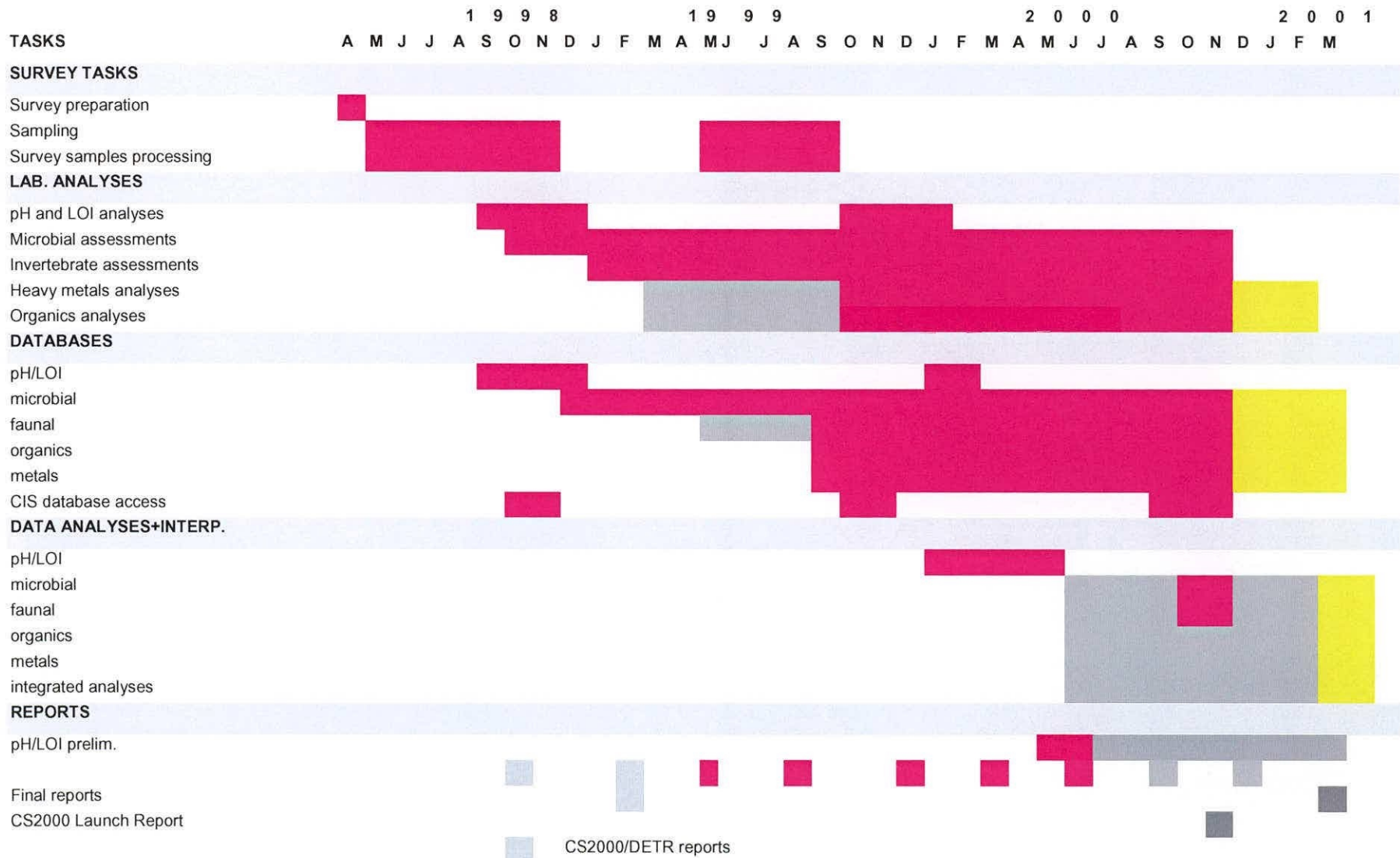
2. Progress

2.1 Development and population of the databases

Considerable effort has gone into the development of a data management system for MASQ, in close consultation with John Watkins (CS2000 Module 13). The structure of linked datasets within ORACLE has been finalised and the first validated datasets have been successfully transferred from ACCESS and Excel into ORACLE. An ACCESS database has been deemed unsuitable for future use due to problems of transferring certain data formats. A timetable for data validation and entry into ORACLE has been proposed – with all validated datasets for biological analyses to be entered into ORACLE by 31.01.01. A full list of ORACLE datasets for each analyses group is being prepared, including meta-data files. This will replace the list started in previous reports. A revision has been started to up-date the 1978 soil type data to the most recent soil classification (major group), using the 1990 mapped data and the 1978 field descriptions. This will allow direct comparison with the National Soil Inventory.

TABLE 1

TIMETABLE FOR MASQ: CS2000 MODULE 6 SOILS & POLLUTION



2.2 Laboratory examination of soil fauna and microbiology

Faunal Identification: All samples have been identified to major taxa and Oribatid species. The taxa data have been entered into Excel and data validation has commenced. Identification of collembola species commenced in August, using the new (as yet unpublished) key developed by Dr Hopkins (Reading Univ.). The Field Studies Council will publish this key in 2001, after extensive testing (CEH Merlewood are taking part in this test and the MASQ samples are proving extremely useful in this process). The staff member responsible for the zoology work left CEH in July 2001. A replacement started by the end of August 2001, however this has not affected the schedule.

Soil Microbial diversity: A total of 990 soil samples from the 1998 CS2000 survey and 117 from the 1999 (Scottish) survey were frozen for analysis of microbiological properties and organic compounds. Analysis of the samples from the 1998 survey was completed in July 2000 and samples from the 1999 survey were analysed in September 2000. The number of samples processed (thawing, sieving and determination of moisture content) and analysed for microbial activity and functional diversity (Community Level Physiological Profiling using the BIOLOG system) to date are detailed below (Table 2). The number of samples re-frozen for analysis of organic chemicals are also indicated.

Table 2	No. of samples		
	processed	analysed	re-frozen
<i>1998 samples (March 1999 - July 2000)</i>	990 (100%)	906 (91.5%)	980 (99%)
<i>1999 samples (August - September 2000)</i>	117 (100%)	81 (69.2%)	115 (98.3%)

2.3 Laboratory evaluation of chemical properties

Heavy metals:

Approximately 550 samples have been ground, digested and analysed by ICP/OES.

The validation process has commenced, and it is expected that this data will be reported by 30th November 2000. There are about 160 samples remaining to ball mill and digest. We are expecting to complete the grinding, digestion and analysis of all samples presently located at CEH Merlewood by 31st December 2000. On completion of the validation, sample digests with undetectable concentrations will be sent to NLS Llanelli laboratory for analysis by ICP-MS.

Table 3: Schedule for heavy metals analyses	
Report validation data	31 st March 2000 – completed
Digestion of subset of 100 soils	30 th April 2000 – completed
Completion 300 soils	30 th June 2000 – completed
Completion 550 soils	30 th November 2000 – completed
Completion 900 soils	30 th January 2001
Completion of all samples	28th February 2001

Organic Pollutants:

Method development and validation has progressed in collaboration with the EA Nottingham. A method for the determination of PAHs, PCBs, Chlorobenzenes and OCPs in soil having been tested with soil samples from CEH Monkwood and is under going validation. Three hundred X-plots have been identified from the CS2000 soil samples for analyses – based on soil type, long-term maintenance of pasture (since 1978) and location. The 1st 100 samples were collected from CEH Merlewood and are stored at –10oC at CEH Monkwood for analyses.

2.4 Data analyses

Further statistical analyses of MASQ soil pH and LOI data was carried out in this period. Considerable effort has gone into converting the 1978 & 1990 soil descriptions into NSI Major Soil Groups – to allow direct comparison with other National datasets.

2.5. Outputs

A presentation on MASQ was given by Dr Black during the Soil Quality Session at the EUROSIL Conference (University of Reading) in September. An abstract has been submitted to the BES for the CS2000 session planned for the first day of this conference. A poster was presented at CONSOIL2000 in Leipzig. Data from MASQ was presented at the CS2000 Launch (November 15th 2001) in London.

The Centre for Ecology and Hydrology has 600 staff, and well-equipped laboratories and field facilities at nine sites throughout the United Kingdom. The Centre's administrative headquarters is at Monks Wood in Cambridgeshire.

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