



Expert Committee on Soil Survey Proceedings of the Tenth Meeting Ottawa, Ontario 19-20 October 1992



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The Expert Committee on Soil Survey is a subcommittee of the Canada Committee on Land Resource Services, which is part of the Canadian Agricultural Services Coordinating Committee system.

> Research Branch Agriculture Canada 1993

Copies of this publication are available from Centre for Land and Biological Resources Research Research Branch, Agriculture Canada Ottawa, Ontario K1A 0C6

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Preamble

The Expert Committee on Soil Survey (ECSS) is a subcommittee of the Committee on Land Resource Services (CLRS) which is part of the Canadian Agricultural Services Coordinating Committee system. Although the ECSS submits an annual report to the CLRS, the subcommittee meets every second year to receive progress reports, discuss issues and identify concerns and recommendations.

This report is a compilation of the various progress reports received from the respective soil survey units, government agencies, working groups and related study groups from across the country. These reports and the ensuing discussions form the basis for identifying concerns and recommendations that are forwarded to the CLRS.

E.E. Mackintosh Ecological Services for Planning Ltd.

Chairman, ECSS

November 6, 1992.

Good Morning! I am pleased to welcome you to Agriculture Canada premises, hosted by some of the capable staff members of our Centre. As part of the Canada Committee system, you have quite a direct role influencing technology and work plans, as opposed to advisory mandates of many other committees in the system.

As you are aware, our Director, Richard Asselin is out of the country. However, he prepared a written welcome before leaving on his trip. I would like now to share his thoughts with you from that memo:

"Welcome to ECSS

I very sincerely regret that I am again in the impossibility of participating to your meeting. I am presently in China, attempting to negotiate a collaboration agreement involving soil science and exchange of biological materials and I could not avoid the conflict of dates. I nevertheless wish to extend to you my warmest welcome to the Centre for Land and Biological Resources Research.

Following the report on the Evaluation of the Soil Inventory Section of LRRC in 1990, several collaborating provinces expressed concern at the perception that we were "pulling out of soil survey". In our replies, we stressed that we continue to attach a lot of importance to soils data, that we maintain our commitment to the development of the National Soil Data Base, in partnership, and that we intend to continue to provide leadership on the questions of soil classification, development of standards and criteria and ensuring the maintenance of a core of expertise in soil survey in Canada. However, now that we have already collected a very large amount of data and completed the small scale survey in several provinces, we expressed our determination, as per the recommendations, to provide more leadership in the utilization of these data.

About two years have elapsed, so it is time to examine whether we are living by our commitments. My own conclusion is that we are doing rather well, considering the very severe financial restrictions, which the whole public service are experiencing as much as we do. I am confident that this is confirmed by your observations.

There have been substantial reductions in the provincial resources allocated to soil survey and re-directions to other activities, in some provinces, but where the province maintained their own, we have also. I expect that we will continue this matching partnership, for as long as needed to complete the reconnaissance level surveys. At scales, larger than 1:50000, it is our position that the surveys are more useful for land management than for preservation of the resource base, and that this is therefore of a provincial responsibility. We may still collaborate at these larger scales, when we can associate other research priorities with them. I add also that project funding for the actual surveys must generally be made available by some outside agency, and that the priority which the provincial government places on soil surveys at the political level is very important in securing those funds. This is, of course, outside the realm of influence of CLBRR or even the Research Branch. In conclusion, if there is provincial commitment and money, we're likely to be there also!

I hope that these few words will re-assure you that the work which you are doing this week and the standards and policies which you are developing continue to be relevant and required.

I am confident that the soil survey philosophy of Agriculture Canada and CLBRR can be explained further by any of our personnel and my able subordinates. Please feel free to discuss this with them.

I thank you very much for your efforts.

Richard Asselin"

When I spoke to you here two years ago, at your last meeting, I referred to change and resource restraints. You are well aware, resources everywhere are more constrained than ever. As a result, all organizations continue to face change and try to adjust to meet objectives. In our own Centre, you now know us as Centre for Land and Biological Resources Research. This change resulted from amalgamation of the former Land Resource Research Centre, and the former Biosystematics Research Centre, one of two amalgamations on the Central Experimental Farm where we now have three research centres. For CLBRR, this enhances our expertise in sustainable agriculture work. Prior to the amalgamation, we had restructured LRRC to form three redefined programs and select three program leaders. This change was meant to better apply our research and soil survey resources to the challenges facing Canada's land resources.

For Dr. Asselin, and myself, I wish you a good meeting.

1.1 YUKON TERRITORY - S. SMITH

1.1.1 SOIL SURVEY COVERAGE

- Completed 25,000 ha of detail survey (1:20K) in the Carcross Valley in southerm Yukon. This makes up Vol. 2 of the Whitehorse Area Soil Survey and completes a detailed mapping project initiated in 1985. No further detailed surveys are planned at this time.
- Completed the 1:1M map of Yukon and first printed version of the map was released in September, 1992. This completed a 5-year project started in 1986.
- Presently working on a new set of Land Resource Area maps at scale of 1:2M as part of a national effort to produce integrated soil/climate/ecological maps for Canada. Use of the map include national state of environment reporting, generalized process modelling and monitoring activities. This is a joint national project with Environment Canada.

1.1.2 PROJECTED SOIL SURVEYS TO 1996

The Yukon government will handle any further requests for detailed survey in the future. The Agriculture Canada Unit Head will act as the technical supervisor or contract authority. Approximately 5,000 ha of detailed soil mapping for residential development was completed under territorial contract this past summer.

Park planning needs in the territory have been identified and include soil survey. Exact scale and scope of this work is not clear at this time. Approximately one month per year (2 crews) of 1:50,000 scale soil surveys are required over the next five years.

1.1.3 PUBLISHING

CLBRR published the SLC map for Yukon in 1992 and they will be publishing the Whitehorse Area Soil Survey in 1993.

1.2 BRITISH COLUMBIA - H. A. LUTTMERDING, P.AG.

1.2.1 SOIL INVENTORY AND INTERPRETATION

Although soil inventory is not a high priority in British Columbia at the present time, some progress has occurred as indicated by the following items. No new inventory projects have been initiated, however.

- Gulf Islands Soil Survey The final volume (Volume 5) of this detailed soil survey has been published and distributed. Publication was by the Center for Land and Biological Resources Research (CLBRR), Ottawa.
- 2) Soils of the Ashcroft Map Area This reconnaissance report has been published and distributed. The report was published by the province while the 1:100,000 scale, 2-colour soil maps (4) were published by CLBRR.
- 3) Biophysical Soil Landscapes Inventory of the Stikine-Iskut Area - This broad reconnaissance report is currently awaiting publication by the province. Three 1:250,000 soil landscape maps prepared by the province accompany the report.
- 4) Generalized Soil Landscapes of BC -The southern 1:1M map and database has received its final edit and is scheduled for printing in Fiscal 92/93 by CLBRR. The northern map is nearing completion in manuscript form and is scheduled for submission early in 1993.
- 5) Describing Ecosystems in the Field, 2nd Edition - High demand has prompted reprinting of this manual. It provides standardized methodology for describing site, soil, vegetation, mensuration, wildlife and humus form data.
- 6) South Moresby National Park -Westland Resource Group, on contract to Parks Canada, has conducted a 1:50,000 scale biophysical inventory of the proposed park area. Resources

inventoried include terrain, soils, vegetation and wildlife habitat.

7) Wildlife Branch, MELP, has undertaken wildlife habitat inventories for several areas in the past two years. These include 1:50,000 scale inventories on parts of the lower Iskut-Stikine river drainages; parts of the Grandby-Kettle river drainages; parts of the McGregor River drainage in east-central BC; parts of the southerm Omineca mountains; areas along the Peace Arm of Williston Lake; several areas in the northern Rocky Mountains west of Fort Nelson and the area near Yellowhead Pass west of Jasper.

> These inventories include a component of soil and terrain survey sufficient to meet the needs of defining and assessing wildlife habitat.

> The Okanagan Critical Areas habitat mapping (1:20,000 scale) has also been ongoing and has covered the areas south from Summerland to the US border. This detailed habitat mapping addresses the needs of unique/endangered species, both flora and fauna, in addition to those of the more common species.

- 8) One Soil Quality Benchmark Site has been established by the BC Land Resources Unit in the eastern lower Fraser Valley, near Chilliwack. Site characterization and initial soil sampling was completed during 1991. Ongoing sampling is progressing as per program outline
- 9) The soil-carbon database for BC is being compiled as part of the national soilcarbon database required for predicting atmospheric changes. The database is being developed from the 1:1M scale Generalized Soil Landscapes of BC - the southern half of the province is essentially complete.
- 10) An erosion risk map for BC is nearing completion. The map, based on the 1:1M scale Soil Landscapes of BC is part of an evaluation of the Soil Landscapes of Canada data set as a basis for soil degradation and other interpretations.
- 11) Development of an agroecological zonation framework relevant to agricultural research and conservation activities, monitoring soil degradation,

state of the environment reporting and production of an agroecological map (1:2M scale) for BC is ongoing in the BC Land Resource Unit. The data model has been designed and reports have been produced. Digital data for the BC Generalized Soil Landscapes - south map and database has been received and will be transferred into Terrasoft GIS, then combined with the Ecoregions of BC map.

1.2.2 SOIL CLASSIFICATION

The 1992 Vertisolic soils field tour included five sites in British Columbia, three in the Okanagan-Shuswap area and two in the Central Interior. Four of the five sites exhibited vertisolic features including well defined slickensides and strong vertical cracking. A few copies of the tour guide (which contains profile descriptions and chemical, physical, mineralogical and thin-section analyses) are still available for distribution.

1.2.3 OTHER PROGRAMS

 The Canada-BC Soil Conservation Program (CBCSCP) is now in operation and deals mainly with issues relating to soil and water conservation, and manure management, mainly through on-farm demonstrations and applied research. Several producer groups (with professional soils contractors) have been formed in the Lower Fraser Valley. They include: aller or

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- a) Cloverdale Soil Conservation Group - organic soil management, cover crops, fertility, organic soils tillage, ditch maintenance.
- b) Delta Soil Conservation Group soil degradation, cover crops, bird management, organic matter enhancement.
- Matsqui/Langley Uplands Soil Conservation Group - water erosion, water management, cover cropping.
- d) Sumas Prairie Soil Conservation Group - wind erosion, ditch maintenance, tillage, cover cropping.
- e) Dairy Producers Conservation Group, Sustainable Poultry Farming Group, Hog Producers

Conservation Group - manure handling and management, cover crops, manure use, water and soil quality protection, equipment for manure handling.

Two conservation groups have also been formed on Vancouver Island to address mainly manure management and cover corps. One group has also been formed in the North Okanagan area. Five groups are also active in the Peace River area, under PFRA administration, and are addressing mainly soil conservation, water erosion and conservation tillage. The consensus is that the producer groups approach is very successful. Funding is provided to those groups with workplans in place - control is through advisory groups composed of representatives from Agriculture Canada, BC Ministry of Agriculture, Fisheries and Food, and the local farming community.

- 2) A Code of Agriculture Practice for Waste Management has been enacted in BC as an alternative to permitting under the BC Waste Management Act. A new agricultural waste management regulation states that if agricultural producers are farming according to the Code they are exempt from the need to obtain a permit. A series of Environmental Guidelines are being produced which described in detailed, quantifiable terms how various production practises must be carried out to ensure compliance. An Agricultural Environmental Protection Council has been formed by the BC Federation of Agriuclture to respond to complaints against the agricultural practises of Federations members. A peer inspector/advisor visits the farm in question, determines the validity of the complaint and provides guidance on any operational change required. Assistance for developing Best Agricultural Waste Management Plans are available through Soils and Engineering Branch, MAFF.
- Water erosion monitoring and prediction, and related activities by BC Land Resource Unit include:
 - a) testing and validation of the US process oriented Water Erosion Prediction Program (WEPP) model using data from the Peace River region;
 - b) monitoring the effects of soil conservation practices on soil loss

and runoff under intensive cropping in the lower Fraser Valley with funding from the Canada-BC Soil Conservation Program;

- c) completion of the evaluation of conventional, reduced and zero tillage on soil loss, runoff and crop yields in the Peace River region; publication of a scientific report is underway;
- d) initiation of a study to estimate, using GIS, the probable magnitude of the annual waste management problem (manure) for the agricultural areas affecting the Abbotsford aquifer.
- 4) The BC Ministry of Forests (MOF) have a variety of soil related studies underway which include the following:
 - Long-term Soil Productivity a) Studies (LTSP) At installations near Smithers, Prince George, and Williams Lake, MOF is determining the effects of organic matter displacement and mineral soil compaction, both individually and in combination. Each installation consists of 3x3 factorial arrangement of treatments. The treatments are three levels of organic matter removal and mineral soil compaction. There are a number of soil biology experiments being conducted on these study sties as well, and soil fauna and fungi are being surveyed.
 - b) Alternatives to Broadcast Burning The relative effects of broadcast burning on soil chemical, physical and biological properties are being compared with the effects of selected mechanical treatments. This work is being conducted in Smithers.
 - c) Soil Impacts Associated with Alternative Harvesting Systems Projects are underway in all Forest Regions examining the impacts of partial cutting silvicultural systems on soil properties. This is an important issue and will likely receive greater attention in the

future because of the potential impact of repeated stand entries on soil properties, and the necessity to maintain permanent skidding corridors.

d) Nutritional Sustainability of Timber Harvesting

Coarse-textured soils with low potassium availability are being sampled throughout the Interior and rates of mineralization are being studied at UBC. Concerns are that potassium may become limiting for forest growth through repeated logging.

e) Impact of Heavy Machine Traffic on Soil Physical Properties

The effects of a wide range of skidding-related impacts on soil aeration and bulk density is being studied on eight sites located throughout the Interior. All sites have been assessed as having high or very high compaction hazards and were also summer logged.

f) Benchmark Soil Disturbance Surveys Following Timber Harvesting

> A detailed survey of 116 benchmark sites was conducted last year and a report was released in 1992. Further surveys are being conducted this year with an emphasis on steep slopes. A Soil Disturbance Survey course will be completed this year.

g) Soil Disturbance Surveys Following Mechanical Site Preparation

Surveys were conducted on a range of sites in 1991 and more surveys have been conducted this year. These surveys have been conducted to test the proposed soil disturbance definitions and to evaluate the proposed Soil Conservation Guidelines for Mechanical Site Preparation.

h) SYTEPREP - System to Evaluate Prescription Effects on Potential Productivity

> An expert system designed to assist field foresters in evaluating various mechanical site preparation

operations is being developed in the Nelson Region. This work is being conducted in conjunction with UBC and is partially funded by the BC Science Council.

SADAM - Soil Attribute Data Manager A poor person's GIS for managing detailed soils information is being developed on contract with Greg Utzig in the Nelson Forest Region. This can be run on a laptop PC and can be utilized very effectively to produce thematic maps. Ideal for generating maps which highlight site sensitivity to harvesting or mechanical treatments.

i)

 Forestry Canada (Pacific Forestry Center) continues with ongoing studies such as monitoring seedling performance and microclimate on impacted soils on clearcut blocks.

New studies relating to alternative silvicultural systems (other than clearcut) are being initiated. These trials, which are still in the early stages of establishment (coastal and interior areas are covered), involve a number of agencies both public and private and cover a broad range of research topics. PFC researchers are studying levels and severity of site disturbance associated with specific harvesting systems, i.e. what changes occur in: soil chemical and physical properties, site climate, and how these changes effect tree growth in the long term. PFC is also involved in researching soil erosion and impacts on water quality on the same watersheds in which the silvicultural system trials are being undertaken. The research will provide definitive information on impacts (both on and off site) of partial harvesting systems on soil and water quality, environmental modification and long-term forest productivity and assist in evaluating future growth calculations for harvest allocation.

6) Resource Inventory Committee (RIC)

The BC Forest Resources Commission in its report (The Future of Our Forests, April, 1991) expressed strong concerns about the overall status of resource inventories in the province and their ability to meet the current

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needs of planning processes, sustainable land use and problem solving. The concern led to the formation of the multi-ministry/agency Resource Inventory Committee in the summer of 1991 charged with the responsibility of reviewing the status of current resource inventories and providing recommendations for addressing the concerns. Inventories to be addressed included Geology, Soils, Archaeology, Vegetation, Range, Timber, Water, Fisheries, Tourism, Culture, Coastal Resources and Climate. Several task forces were established to address the state of the inventories, coverage, consistency in methodology and content, format and availability, scale, and future needs, among others. Task Force findings were presented at a 2-day workshop in May, 1992. The Soils, Geology and Archaeology Task Force conclusions contained, among others, a strong need for reestablishment of a BC soil inventory program to provide correlation, quality control, information dissemination, testing, as well as mapping capability.

Reorganized Task Forces after the workshop were charged with developing consistent methodologies, and classifications for the various inventories, defining standards required, identifying overlaps and gaps between inventories, priority interpretations and methods, recommendations for data handling, etc. These are to be completed by Spring, 1993, after which field testing will begin.

Concern

To date, approximately ten map areas in the province have been entered into the National Soil Data Base in CLBRR. Most are located in the Central Interior and were mapped (1:100,000 scale) by the BC Land Resource Unit with maps/reports published through Ottawa. Ongoing input of about ten other areas (particularly those requiring digitizing) seems to have stalled. Most (e.g. Vancouver Island, East and West Kootenays) were inventoried by the province with maps either published provincially or through Ottawa. If the intent is to continue the program, schedules, etc., should be developed since provincial review/edit of various layer files will be required. Input of large scale (detailed) data sets, e.g. Langley-Vancouver, Okanagan, is also suggested since these contain many of the more important agricultural areas in British Columbia.

1.3 ALBERTA - R. HOWITT

1.3.1 OPERATIONAL INVENTORY

Field work for mapping at a scale of SIL3 1:50,000 was completed in the M.D. of Rocky View in the 1992 field season and is continuing in the County of Forty Mile (Alberta Soil Survey). We anticipate completion of the field mapping in Forty Mile in the 1992 field season but expect to use a portion of the 1993 field season for final field correlation. This will bring to an end the 1:50,000 mapping program in Alberta in favour of the GREEN PLAN proposal to develop 1:100,000 soil information products.

Manuscript maps and the accompanying legend for the Gleichen Map Sheet (S 1/2 821) were correlated and are ready for review. A vertisol tour guide was prepared and a field tour was conducted for Alberta.

Soil mapping for irrigation classification (Alberta Agriculture) was completed for 207 parcels of land in southern Alberta. The number of investigations is lower than in the previous two years based on a decline in requests for investigations and because most of the available irrigation water has been allocated. Alberta Agriculture is ready to print 6 1:250,000 NTS maps sheets of synopsis data based on all level 3 irrigation investigations completed between 1980 and 1987.

Mapping of soil, vegetation, erosion hazard and grazing capability (Alberta Forestry, Lands and Wildlife) was conducted on rangelands in southern, north eastern and the Peace River regions of the Province. The rangeland reference site program is being expanded in order to verify grazing capability interpretations. Techniques to overlay vegetation data and Physical Land Classification maps are being investigated for grazing land management decision support.

1.3.2 INFORMATION SYSTEMS

The development and implementation of land information systems continues to be a priority for most government agencies (Federal and Provincial) involved in soil and land information. A soil names file project wherein soil correlation areas were defined for the province was continued into a second phase. A User Test Version of the "Alberta Soil Names Generation 2: Users Handbook" was distributed to about 150 users and organizations. The Soil Information Database for Management and Planning (SIDMAP) data base is installed on Alberta Research Council computing facilities and is available for use and/or distribution.

An Alberta Soil Information Center is being developed at the Alberta Research Council (ARC). Distribution of all federal and provincial soil survey reports has been consolidated with the transfer of the inventory of reports and maps from the University of Alberta, Faculty of Extension to the ARC publications office.

Digitizing of the Red Deer Sheet was completed and Polygon Attribute files prepared. A land systems map (1:250,000) and report were prepared for the County of Stettler and are in review.

The soil carbon data base was completed for Alberta and delivered to the project leader.

A report "Evaluation of the Suitability of the EPIC model as a tool to estimated erosion from Selected Landscapes in Alberta" was prepared and submitted to the NSCP/CASCI - Policy Review Committee.

1.3.3 INVENTORY METHODS RESEARCH

As part of a joint federal provincial initiative and partially funded by NSCP-CASCI, a literature review of soil mapping systems was completed. This document includes a section discussing options and rationale for new mapping systems which led to a proposal to compare three of the systems with SIL3 1:50,000 mapping. It is anticipated that the field work for this project will be completed this field season and that a final report will be completed by March 31, 1993.

1.3.4 STAKEHOLDER SUPPORT AND INTERACTION

The Alberta Coordinating Committee for Soil and Land Inventory (ACCSLI) has not met since July 1991 but communications with individual agencies (specifically Agriculture and Municipal Affairs) has been ongoing. The future of the Soil Inventory Subcommittee is still unclear. The former subcommittee which reported to the Alberta Soil Advisory Committee was disbanded in 1990. The Soil Inventory Committee met in the fall of 1991 and the winter of 1992 to discuss terms of reference regarding the committee's role and possible reporting mechanisms. There is strong support from all represented to have the subcommittee continue in a technical advisory capacity to the Provincial and Federal Governments.

1.3.5 A STRATEGIC LOOK AT THE FUTURE

The federal and provincial soil survey units have proposed development of a soil information system that would produce a 1:100,000 scale, polygon-based automated soil data framework for the province by 1998. The proposal is to be jointly funded by Alberta Research Council, Agriculture Canada, and Alberta Agriculture. The proposed timeframe of the project is predicated on continuation of significant contribution through the Federal/Provincial join agreement on Sustainable Agriculture.

The shift in focus from operation inventory in the form of 1:50,000 scale mapping of municipalities to development of a standard information product for the entire agricultural portion of the Province is based on our assessment of future availability of support for soil survey activities. The changing societal priorities that resulted in the Federal soil survey pulling back from operational inventory are being increasingly felt in Alberta. This shift in focus is considered to provide the optimum level of service to the broadest set of stakeholders, given the resource constraints under which we are operating.

1.3.6 PROVINCIAL LAND RELATED INFORMATION SYSTEMS (LRIS)

The development of Alberta's Provincial LRIS is progressing rapidly with the implementation of the spatial database scheduled for August 31, 1993. Soil information is scheduled to be the 4th thematic layer implemented and this creates a high need to have the soil information system for the province in place and compatible with Provincial LRIS.

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1.3.7 ISSUES AND CONCERNS

With an increasing demand for digital soil maps the distribution of digital products raises several issues:

- 1. Availability (or lack thereof) from CANSIS of existing digitized soil maps,
- Copyright and third party distribution of soil information products,
- Multiple copies of digital soil products and a need to identify which is the original and seen by the soils community to be correct,
- Pricing and distribution of digital soil products.

1.4 SASKATCHEWAN - D.W. ANDERSON

Soils surveys in Saskatchewan are the responsibility of the Saskatchewan Institute of Pedology (SIP), at the University of Saskatchewan. The SIP is composed of the Saskatchewan Land Resource Unit, Centre for Land and Biological Resources Research (CLBRR), and soil scientists employed by the University with joint Federal and Provincial funding. Soil Survey has strong linkage to the Department of Soil Science and the Saskatchewan Soil Testing Laboratory. Funding for Soil Survey in 1991-92 was from the Saskatchewan Agriculture Development Fund, and funds from the Government of Canada through PFRA as part of the Soil and Water Accord, and the Environmental Sustainability Initiative (ESI).

1.4.1 SOIL SURVEYS COMPLETED IN 1991-92

Soil surveys are done on a basis of rural municipalities, with a separate report and maps for each RM, and finally a computer-based soil survey information system (LANDBASE) for each RM. In the program known as the accelerated soil survey program, mapping is completed in one field season, and reports (done by desktop publishing) and maps are available within one year. A primary objective of the survey is to prepare maps for use in soil conservation planning.

In 1991, soil surveys were completed for 3.75 million (M) acres in RMs 17, 18, 19, 43, 46 (Western Soil Survey Crew); and 218, 218, 220, 221, 250, 279, 309 and 520 (Eastern Crew). Steady progress was maintained in that during the 1992 field season 3.5 M acres were mapped in RMs 44, 45, 257, 261, 287, 288, 290 and 292 (Western Crew) and in RMs 244, 245, 246, 274 and 275 (Eastern Crew). The work completed in 1991 is now available in map and report form, and the 1992 surveys will be available by May, 1993.

1.4.2 ESTIMATED SOIL SURVEY COVERAGE, 1993-96

The soil survey's plans a systematic completion of all RMs in the agricultural region of Saskatchewan, the area south of about 54°N that contains 45 M acres of cultivated land. The plan, subject to renewed funding under the Green Plan and continuing support by both Saskatchewan and Canada, is to map about 3.5 M acres each year in 1993, 1994 and 1995. This will give complete coverage in both published maps and

reports, and in computer-based soil information systems.

1.4.3 SOIL SURVEY REPORTS PUBLISHED: 1991-92

- Large format, soil atlas reports: The Soils of Record, Tramping Lake and Buffalo RMs. The Soils of Langenburg, Fertile Belt, Churchbridge and Saltcoats RMs.
- ii) Preliminary (desktop published report plus map) reports

RM of Craik (222) RM of Cupar (218) RM of Frontier (19) RM of Glen McPherson (46) Rm of Last Mountain (250) RM of Lone Tree (18) RM of Long Laketon (219) RM of Long Laketon (219) RM of McKillop (220) RM of Old Post (43) RM of Old Post (43) RM of Prairie Rose (309) RM of Sarnia (221) RM of Val Marie (17) RM of Wolverine (340)

1.4.4 LIST OF BACKLOG MAPS AND REPORTS

The Cartography Section CLBRR has four of the RM Soil Atlas Reports (large format) that are in process. Fifteen RMs are to be included in those four reports. An agreement between the SIP and CLBRR is to complete these reports as funds become available for publication.

1.4.5 OTHER MAJOR ACTIVITIES - 1991-92

The Soil Survey has participated in several projects in addition to the regular program of soil inventory. The project includes:

Soil correlation activities include internal reviews and field maps to maintain consistency within Saskatchewan, preliminary work on updating soil surveys in the northern agricultural area, and a prairie-wide correlation tour that focused on the classification of clayey soils and the definition of a new order of clayey, vertic soils in the Canadian classification system. Input to the Soil Carbon Map of Canada based on the Soil-Landscapes Maps of Canada (joint with CLBRR).

Deep-tillage of Solonetzic soils, for enhancing crop production (joint with Department of Soil Science).

Soil Survey for Grassland National Park - for Parks Canada, and including both soil and interpretive information for use in park planning.

Soil Survey for Geographic Information Systems -A Data Analysis section has been established to support ongoing mapping projects, convert all maps to digital format, and to react to requests for specific soils information and interpretations.

Conservation Planning RM Maps - (ESI support) -This project provided PFRA with GIS-based, interpretative maps for conservation planning for thirty RMs, with seven theme or interpretive maps for each RM.

Value of Topsoil Project (ESI support) - Soil Survey personnel worked jointly with the Department of Soil Science to prepare a report and computer model to estimate the value of topsoil in terms of positive impacts on crop production.

NSCP - Soil Quality Evaluation Project - Soil surveys have responsibility for monitoring projects in soil salinity, wind erosion and the soil benchmarks project.

Boreal Ecosystem - Atmosphere Study (BOREAS) -Canadian and American scientists participated in an evaluation of experimental sites in Prince Albert National Park, adjacent forest land in Saskatchewan, and the proposed Nelson House site near Thompson, Manitoba. The SIP provided local soils expertise for that evaluation, working with teams of forest ecologists. The work was funded by NASA of the U.S.A.

Soil survey extension and education - The Soil Survey continues its programs of displays at major agricultural and soil conservation meetings and workshops, and has participated in educational programs for urban and aboriginal children.

1.4.6 INVOLVEMENT IN FUTURE PROGRAMS

The Soil Survey in Saskatchewan continues to have as a primary objective the completion of the soil inventory, related maps and soil information systems for the agricultural region of Saskatchewan. This effort, as outlined earlier, will be a main focus until 1996. Funds will be required under the proposed Green Plan initiatives which are related to the Agri-Food Strategy and soil conservation programs.

The Soil Survey recognizes, however, the need for a plan to move our program from an emphasis on inventory, to emphasis on use of soil survey information, interpretive maps, soil information systems, and other concerns. Soil surveys are the preferred source of soil databases and maps for global change programs such as BOREAS, the Northern Biosphere Measuring Experiment (NBIOME) and Agriculture Canada's Greenhouse Gases Program. Finally, despite the perceived adequacy of the comprehensive coverage in maps and computer-based formats, the SIP is considered a new generalized soil map for Saskatchewan. This would be a strong pedology-based, agriculturally-oriented map, with a report and legend written in language understandable to the general public. This report would serve in much the same way that the Soil Survey Report No. 12 (1944) has done until now.

1.4.7 PRIORITY CONCERNS AND REQUIREMENTS

Like most other groups, funding to complete the soil survey is a priority concern, in that much of the usefulness of current information depends upon having complete information for all of agricultural Saskatchewan. 11

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In addition, there is the need at a national level for a renewed vision of soil survey that recognizes the value of soil survey to not only local concerns such as soil conservation, but the important role that soil surveyors can play in developing appropriate maps and reports for regional national and global initiatives, particularly the Global Change programs. Soil surveyors know how to scale up from local to regional and national scales.

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1.5 MANITOBA - R.G. EILERS & G.F. MILLS

A cooperative program of soil inventory and related activities in soil characterization, soil interpretation and land evaluation continues with the support of Agriculture Canada (Manitoba Land Resource Unit of the Centre for Land and Biological Resources Research), Manitoba Agriuclture (Soil Survey Unit of the Soils and Crops Branch), the National Soil Conservation Program (NSCP) and the University of Manitoba (Department of Soil Science). The provincial soil survey unit activity is focused primarily on soil inventory, whereas the federal unit resources focus mainly on soil data base development and the monitoring and research requirements for the Soil Quality Evaluation Project of NSCP. The main program activities in Manitoba for 1992 are described and concerns and issues are summarized.

1.5.1 SOIL SURVEY COVERAGE COMPLETED

- RM of North Cypress (116,550 ha; 450 sq. mi.), 1:20,000 scale soil survey was continued. The inventory for 71 percent (320 sq. mi.) of the study focusing on the area having potential for intensive land management our special crops, irrigation and risk of environmental degradation, having been completed to date.
- RM of Strathcona, 1:50,000 scale, inventory has been completed for 46,880 ha, 9181 sq. mi.).
- both of these projects reflect the provincial priority for upgrading the reconnaissance soil data base for the South Central Map Area (1943) and the Carberry Map Area (1957).
- Summary of field inventory progress:

	North Cypress (1:20K)	Strathcona (1:50K)	Total
1991 (ha)	27,455	23,830	51,285
1992 (ha)	24,660	23,050	47,650
Totals	52,055	46,880	

Total area of inventory is lower for both years than initially planned due to downsizing of the provincial survey staff and repriorization of federal staff.

1.5.2 ESTIMATED SOIL SURVEY COVERAGE REQUIRED DURING PERIOD 1993-96

The priority for soil inventory is determined on an annual basis through the Soil Survey Advisory Board (SSAB). The SSAB membership represents federal and provincial government departments and agencies that are major clients and stakeholders in the survey program.

Internal forward planning of the overall inventory program is difficult because of the dependence on annual requests received from stakeholder agencies via the SSAB. Such requests often reflect specific planning needs that are of shorter term but, none the less, of critical urgency. Longer term planning for federal and provincial agriuclture requirements based on our experience in the recent past (1985-1992) would require an annual inventory capability of approximately 600 sq. miles at 1:50,000 scale or 300 sq. miles at 1:20,000 scale. This level of activity appears to be satisfactory to the province and would derive from three provincial surveyors and two federal surveyors with full field support during the field season. The current joint support to the field inventory program is approximately 60 percent of this capacity.

Future inventory programs would focus on:

- remaining land areas within the Upper Assiniboine Delta which are suitable for irrigation.
- rural municipalities within the South-Central Map area in which extensive dryland agriculture is the dominant land use but where local soil and terrain characteristics result in soil management concerns relative to risk of soil degradation by erosion or salinization.
- Big Grass Marsh and adjacent land areas to rationalize multi land use for wildlife and agriculture and purchase of critical land areas for management as Crown Lands.
- Completion of the resurvey of several Rural Municipalities which are currently 75 per cent or more complete. This will facilitate completion of digital maps and data bases for RMs at 1:20K and 1:50K scale maps.

1.5.3 SOIL SURVEY REPORTS PUBLISHED 1991-92 THROUGH SOILS AND CROPS BRANCH, MANITOBA AGRICULTURE

- reports and maps were published for the RM of North Norfolk (1:20,000) and the RM of Rhineland (1:50,000).
- reports and maps were prepared to publication stage for the RMs of Hanover and Pembina (1:50,000 scale).

1.5.4 BACKLOG MAPS AND REPORTS SUBMITTED TO CLBRR FOR PUBLICATION

 Pointe du Bois reconnaissance soil map has been edited and returned to CLBRR for printing. Printing will be to a line map base with data and interpretations on the reverse side. No formal report is planned at this stage. Data and maps will be available in digital and GIS format on request to the Manitoba Land Resource Unit.

1.5.5 OTHER MAJOR ACTIVITIES COMPLETED DURING 1991-92

- Hazardous Waste Management Site two detailed studies were completed in the Red River Valley for the Manitoba Hazardous Waste Management Corporation.
- Extension Activities papers presented at 36th Annual Manitoba Soil Science Meeting; posters presented at the annual Agri-Forum; contribution to a chapter on Agrometeorology textbook; National Soil Conservation.

1.5.6 INVOLVEMENT IN FUTURE PROGRAMS

The following initiatives and future programs are being developed in collaboration between Manitoba Land Resource Unit (MLRU) and various other agencies. At this point in time it is not possible to assess the extent of involvement of the provincial soil survey in these initiatives. Near-future activities of the provincial soil survey as outlined above, will likely include continued field inventory, soil characterization, and irrigation suitability evaluations along with an increased focus on mobilizing the detailed resurvey information in digital formats. It is likely that involvement in the following initiatives will be largely by the MLRU.

1. GREEN PLAN INITIATIVES

Ten different proposals have been developed for Manitoba in which Manitoba Soil Survey and MLRU has some involvement. These proposals were developed in conjunction with staff of Agriculture Canada Research Stations (Morden and Brandon), Manitoba Agriculture and University of Manitoba. There is a particular (critical) need to demonstrate our integration with the work being done in the Soil Science Department and the mutual benefits gained by having the MLRU and provincial soil survey strategically located within the Department. Especially since the concept of a formal MOU has not received encouraging reviews from either the province or the University. One of the overall objectives of these proposals is to link research and monitoring to known soil types and terrain conditions so that land evaluations based on this research can be extrapolated via our provincial and national soil data base using various computer models and our developing GIS technology.

These proposals represent excellent opportunities to establish links and partnerships with Research Stations and the University and to share in the costs. All of these proposals tie in closely with our provincial and national objectives under soil inventory, Soil Quality Evaluation Project and National Soil Data Base. Each of the proposals is budgeted to accomplish the stated objectives. Also, each is designed to be readily integrated with current A-Base expertise and resources of MLRU and the provincial soil survey unit.

2. MANITOBA HYDRO PROPOSAL TO PROVIDE BIOPHYSICAL RESOURCE INFORMATION TO MANITOBA HYDRO FOR THE BIPOLE III STUDY AREA

The Land Resource Unit in Manitoba has received a request from Manitoba Hydro (5.04.1992) to provide land resource information obtained for northern and north eastern Manitoba (area outside ARDA boundary) during the Northern Resource Information Program. The data is required in digital GIS format for the upcoming provincial and federal environmental review program for the Bi-pole III transmission corridor study in northeastern Manitoba. The request is for maps and data only which would contribute significantly to enhancing the provincial and national soil data base for Northern Manitoba. Adequate funding would be made available from Manitoba Hydro to complete the project.

3. MANITOBA MUSEUM OF MAN AND NATURE

MLRU has been approached to provide assistance in developing an interactive GIS display for the general public. They (MMMN) are currently developing a section on the Parklands of the Prairies and have requested information on soils, including display profiles, pictures and digital maps. Funds may be available depending on the type of assistance requested. This request represents an excellent opportunity to market the concept of soils, data bases and digital maps to the general public using interactive computer technology.

4. PARKLAND AGRICULTURE RESEARCH INITIATIVE (PARI): CONSERVATION DEMONSTRATION FARM

PARI was initiated in 1992 by Agriculture Canada Research Branch to address concerns about soil degradation in the Parklands Region of the Prairies. Toward this end, a Conservation Demonstration Farm (one of three on the prairies) will be located in Manitoba. The primary focus of Pari is to enhance technology transfer of effective conservation production systems. This farm could provide an additional location for benchmark sites for monitoring soil quality as affected by conservation land use.

1.5.7 PRIORITY CONCERNS AND REQUIREMENTS

1. DATA RELEASE POLICIES - MAPS, REPORTS

There is an urgent need to establish a protocol or policy for providing digital soil data and maps to clients, requesting agencies and the general public.

2. STAFFING (POSITIONS)

- The province would strongly support the efforts by CLBRR to restaff the soil/crop modelling position (formerly Onofrei) in the MLRU.
- The province would also recommend and strongly support efforts by CLBRR to provide GIS expertise and technical assistance to operate the PAMAP system located in MLRU. The equipment and system is greatly under utilized since current provincial resources available to operate PAMAP is approximately 0.6 py.
- In the interest of maintaining a viable cooperative program of soil inventory and related soil characterization, soil interpretation and land evaluation, the province would urge CLBRR to provide

budget to maintain at least 1.4 py technical involvement in soil inventory.

The province is intending to maintain technical and professional staff at the 1991-92 level in order to provide a core group of balanced expertise to interpret and deliver soil resource information for Manitoba.

1.6	ONTARIO - R. VAN DEN BROEK
1.6.1	SOIL SURVEY COVERAGE 1991/92

- The detailed pits were done and some field revisions were completed for all of Kent County.
- A portion of Prince Edward County was resurveyed because of a request from the Land Use Planning Branch to reconfirm earlier C.L.I. classifications.

1.6.2 ESTIMATE SOIL SURVEY COVERAGE FOR 1993-96

 We have several county maps that lack information and could be upgraded. We currently have no plans to upgrade on a county basis. We will upgrade as need dictates.

1.6.3 SOIL SURVEY REPORTS PUBLISHED 1991/92

- Elgin County
- Middlesex County

1.6.4 BACKLOG OF MAPS AND REPORTS SUBMITTED TO CLBRR

- Brant maps
- Elgin maps
- Requested reprints for Victoria, Dundas, Manitoulin, Stormont and Grenville

1.6.5 OTHER MAJOR ACTIVITIES COMPLETED 1991/92

- signed a new five-year agreement
- have a new name, "Ontario Centre for Soil Resource Evaluation"
- have a new coordinating director Bruce MacDonald

- have a workplan for the next twelve months
- completed special crop suitability and soil interpretations for water erosion for Elgin and Middlesex Counties.
- assisted in various projects, e.g. soil suitability for treatment trench systems, characterized soils on research plots, presented C.L.I. capability information to planner, selected 179 sites for groundwater survey.
- carried out research on livestock manure application, soil productivity (Kent County), transport pathways of pesticides conventional vs. conservation systems
- completed soil survey upgrade study for Ramsay Township in Lanark County under contract to Gregory Geoscience; other upgrade activities included development of a standard legend for southern Ontario, and the application of digital elevation data.
- extended our GIS data base and continued to create and distribute special interpretation maps for users.

1.6.6 INVOLVEMENT IN FUTURE PROGRAMS

- Green Plan, at committee level and possibly on projects, several staff involved
- Environmental Farm Planning will provide opportunities (yet to be identified)
- Clean Up Rural Beaches (CURB) requests for GIS interpretations
- Methodology development for soil survey upgrades. Procedures for both inhouse and contract upgrades.

1.6.7 PRIORITY CONCERNS AND REQUIREMENTS

- focus on new Agreement is on interpretation of soil and related information that is on our data bases and is requested and required by users. Less attention and time will be spent on county surveys and resurveys. The trend is toward doing what needs to be done as opposed to what would be nice to have in the file.
- staff and resources will be under restraint and careful choices will be made on priorities considering the needs of all three agencies and their clients.

1.7 QUEBEC - J.M. COSSETTE

Le Dr. Carrier ne sera pas présent à la réunion du 19-20 octobre. Il m'a demandé de vous transmettre le rapport ci-joint qui ne traite que des activités du MAPAQ.

If faut rajouter à la liste les activités du Centre de Recherche sur les Terres et les Ressources Biologiques-Québec (CRTRB) soit;

1.7.1 RAPPORTS PUBLIÉS EN 91-92

- Étude pédologique du comté de Saint-Hyacinthe
- Étude pédologique du comté de Chambly

1.72. ACTIVITÉS MAJEURES EN 92

- La cartographic du comté de Laprairie est complétée. L'échantillonnage des sols se fera en 1993.
- La rédaction du rapport du comté de Rouville est en cours en vue de sa publication en 1993.
- Un fichier des séries de sols du Québec est en préparation. Il est compilé à partir de toutes les informations publiées à ce jour dans les rapports pédologiques.

1.7.3 RELEVÉS PÉDOLOGIQUES PRÉVUS POUR LA PÉRIODE 1993/1996

 Les comtés de Saint-Jean, Iberville et Napierville à l'échelle de 1:50,000.

1.7.4 RAPPORT D'ÉTAPE 1991-1992

- Les cartes pédologiques du comté de Beauce sont finalisées au stade noir et blanc et une première rédaction du rapport pédologique a été réalisée;
- La vérification de la cartographie a été parachevée su fond de photographies aériennes pour 95% de la superficie du comté de Frontenac. Les analyses sont terminées. L'interprétation des résultats et la rédaction du rapport sont au stade embryonnaire;
- Les cartes pédologiques au 1:20,000 des sols défrichés de l'Abitibi-Témiscamingue sont

finalisées au stade noir et blanc pour 60% du territoire et une première rédaction des rapports pédologiques a été réalisée;

- L'étude pédologique du comté de Wolfe progresse normalement; quelques 25,000 ha à 30,000 ha ont fait l'objet de cartographie cette saison;
- Les études pédologiques des comtés de Beauce, Frontenac, Wolfe et des sols défrichés de l'Abitibi-Témiscamingue sont toutes prévues pour la période de 1993-1996;
- Les discussions et les rencontres ont été poursuivies avec les réfions, les stations de recherche d'Agriculture Canada et les Universités en vue d'implanter l'Observatoire. Celles-ci ont permis d'obtenir l'adhésion des chercheurs de ces organismes et par le fait même, la préparation du statut de l'Observatoire;
- Un secteur stratégique a été identifié dans le domaine de l'éco-pédo-toxicologie et une étude préliminaire de la teneur en métaux lourds des sols et des plantes est en réalisation avec la collaboration du laboratoire de chimie alimentaire du MENVIQ;
- Séances de cours en pédo-gémorphologie données à la Faculté d'Agriculture de l'Université Laval;
- Réalisation d'une expertise pour le MAPAQ sur la teneur totale en métaux lourds des sols d'un secteur stratégique;
- Réalisation d'une première analyse des données régionales et des données pédologiques disponibles sur les fermes fédérales et universitaires en vue du choix des sites de l'Observatoire;
- Une nouvelle entente de coopération a été signée entre le Centre de recherches sur les terres et les ressources biologiques et le Service des sols sur le programme pédologique à réaliser jusqu'en 1996 et la mise en place d'un projet de recherche conjoint sur l'étude comparative du matériau parental dans les tills appalachiens a été initié.

1.7.5 1992 ...

 Continuer l'implantation de l'Observatoire par la constitution d'un comité scientifique responsable du fonctionnement des sites, par l'éstablissement d'ententes avec les directeurs des stations de recherche et par la description pédologique des sites;

- Poursuivre l'étude de corrélation entre la teneur totale et la forme assimilable des métaux loûrds dans le sol en vue d'établir des normes agronomiques et environnementales;
- Participation des pédologues aux comités du CPVQ à différentes congrès et rencontres scientifiques;
- Réalisation d'expertises en pédologie pour répondre aux besoins et demandes;
- Évaluation des sites de l'Observatoire;
- Réalisation d'expertises en éco-pédotoxicologie selon les besoins créés par les accidents et les catastrophes.

1.8 NEW BRUNSWICK - H.W. REES & I. GHANEM

1.8.1 SOIL INVENTORIES

A continuing major inventory activity of the NB Dept. of Agriculture is the on-farm soil survey program. This program is designed to provide detailed soils information at the farm level which can serve as a basis for land and crop management. New methods of information presentation which employ microcomputer drafting and digital scans of aerial photography are being investigated.

The federal soil inventory program was continued in the Woodstock - Florenceville survey area with completion of one additional 1:20,000 map sheet. Additional inventory related activities included: compilation of a soil carbon file for the Soil Landscape Map of New Brunswick; publication of reports for the Chipman - Minto - Harcourt region, Woodstock -Florenceville Volume 2, and the Agriculture Canada Benton Ridge Potato Breeding Substation; and continued work on map attribute files.

1.8.2. GIS

Integration of existing soil survey information with other data bases (digital base maps, property ownership, forest cover type, etc.) using GIS technologies to supply policy makers with information on which they can make informed decisions. Specific activities include:

- a) identification and delineation of potential land areas for potato production expansion in Victoria and Madawaska Counties
- b) designation of potential areas for land consolidation which would be adequate to support new agricultural developments in Kent County
- c) impact assessment of proposed Trans Canada Highway corridors on agricultural land and production in the New Brunswick Potato Belt
- a case study in the Black Brook Watershed of present soil erosion risks under potato production and potentials for reduction given various management scenarios
- e) generation of information on land use related issues for preparation of submissions to the New Brunswick Commission on Land Use and the Rural Environment

1.8.3. RESEARCH

Watershed study approach to investigate and monitor the impact of various farming systems on soil and water quality as it relates to sustainable agriculture and environmental protection concepts and principles in New Brunswick's potato lands. The project initially consisted of surface water quantity and quality monitoring on the Black Brook Watershed with associated climate and land use data collection. The project has been expanded to include studies on the impact on ground water in cooperation with the Ground Water Studies Group at the University of New Brunswick, and to include a pesticide component in cooperation with the Dept. of Oceans and Fisheries and the NB Dept. of the Environment.

The implications of different tillage methods on runoff and sediment loss are being investigated at the permanent soil erosion plot sites. Data is also being collected on over-winter rates of runoff and soil loss.

1.8.4. SOIL QUALITY MONITORING

Soil quality monitoring continued at two benchmark sites under intensive potato production. This is part of the national program on benchmark sites for agricultural land quality monitoring in Canada. The major forms of soil degradation being monitored at these sites are: soil erosion, compaction, organic matter loss, acidification, and heavy metal/insecticide/pesticide contamination.

1.8.5. SOIL CONSERVATION PLANNING

A joint workshop was sponsored by the New Brunswick Dept. of Agriculture and the USDA Soil Conservation Service to demonstrate the usage of the USLE and the revised RUSLE, and to establish "C" factor values and the correct application of slope factors given New Brunswick conditions. Information was exchanged regarding soil conservation planning and strategies for the farm level. An informal agreement for continued cooperation has been established between the NBDA and the USDA SCS.

Contributions

Contributions were made to program development for the Eastern Canada Soil and Water Conservation Centre.

1.8.6 CONCERNS AND ISSUES

- Lack of quantified predictions of soil behaviour in terms of soil quality and crop performance under various management practices and land uses. Crop productivity and potential soil quality deterioration and environmental degradation as a result of specific land use management practices on selected soil types must be quantified. Existing interpretive tables are not sufficient for sound decision-making.
- 2) Application and importance of GIS in providing information for informed decision and policy making. New Brunswick has the potential to be a leader in this field. Applications are only limited by a lack of support. Expanded support is required for GIS activities. This includes both hardware and software and especially support personnel. The present jointly-operated federalprovincial geographic information system, 'NB ALIS', needs additional support if the usefulness of available soils information is to be optimized.
- 3) Dependency on "soft" money for research. While soils research has benefitted greatly as a result of funding through the various federal-provincial initiatives, many of the projects initiated under these agreements are long term in nature and will require continued support to operate. Reductions in A-base support for these and other soil related research endeavours is a major concern.

4) Land resources and environmental quality and related research are a large component of the Green Plan. However, initial proposals for the New Brunswick agricultural component of the Green Plan initiative do not directly address research. Research is only indirectly considered under technology transfer and demonstration elements. The national program is supposed to address research issues. What does the national program consist of in terms of soils and soil related environmental quality research, and how have these funds been distributed to ensure local provincial involvement?

1.9 NOVA SCOTIA - K. WEBB

1.9.1 CURRENT SOIL SURVEY ACTIVITIES

The Land Evaluation and Planning Service (LEAPS) is the only inventory program currently operating in Nova Scotia. A program of the Nova Scotia Department of Agriculture and Marketing (NSDAM), LEAPS completed 8 detailed on-farm soil surveys (approx. 800 ha at a scale of 1:10,000) in 1992 bringing the total number of farms completed since the inception of the program to 72. LEAPS has shortened the delivery time of soil and interpretive map products to clients through the use of the NSDAM Geographic Information System. In addition, LEAPS has completed detailed soil surveys for special requests (forest nursery, research projects, proposed land development projects, etc.).

1.9.2 FUTURE SOIL SURVEY ACTIVITIES

Future requests for soil survey information will come primarily from farmers and will be directed to LEAPS. NSDAM plans to escalate the promotion of the LEAPS Program within the agricultural community and continue to improve their service and turn-around times for soil and interpretive map products as well as expand and refine their interpretive products in response to client needs.

1.9.3 ACTIVITIES COMPLETE

Activities completed in 1991-92 include a report on merging Census of Canada data with Agricultural Resource Areas of Nova Scotia; the Soil Carbon Data Base Files for Nova Scotia; a Soil Erosion Risk Map of Nova Scotia; and publication of Manure Management Guidelines for Nova Scotia.

1.9.4 ACTIVITIES IN PROGRESS

On-going soil survey, monitoring, and soil resource research activities include publishing the Kings County contract soil survey report; using farming systems to map agricultural land use; producing a Land Resource Area and Land Resource Regions map for the Maritime Provinces; completing the third year of operating a soil quality monitoring Benchmark Site; publishing the results of the Soil Watertable Monitoring project; determining the effects of land rolling blueberry fields with industrial equipment on soil structure and crop yield; evaluating soil erosion using Cesium-137; determining the extent of streambank erosion in the Annapolis River watershed and it's relationship to land use; evaluating the effectiveness of subsoiling in increasing subsurface drainage performance and the survival and yield of forage and cereal crops; assessing the effectiveness of subsoiling before and after the installation of standard and small diameter subsurface drainage pipe; evaluating the effects of drain pipe spacing on the performance of subsurface drainage systems; evaluating nutrient balance and improving the efficiency of nutrient use on selected farming systems; well water monitoring and evaluation; production of soil kits and a video on the importance of soils as resource material for schools; lysimeter studies of the effects of whole-tree versus conventional harvesting on nutrient loss from soils.

1.9.5 SOIL SURVEY AND SOIL RESOURCE RESEARCH PRIORITIES

Soil survey up-grades are required for Hants, Antigonish, Lunenburg, and Queens county. These surveys were published in the 1950's and lack basic information such as slope and stoniness. Hants and Antigonish counties were published at a scale of 1:126,720 and lack the detail of more recent county soil surveys. In addition, many of the older reports will soon be out of stock and reprinting will have to be considered.

A soil sampling and analysis project is required to produce chemical and physical data for the major soils in the province. This information is required to verify the predominantly estimated data contained in the CanSIS soil layer file.

Completing the digitization of all county soil survey maps and the CanSIS Soil Layer, Soil Map Unit, and Soil Name files for the semi-detailed (1:20,000 scale) is required to facilitate the use of these coverages on the NSDAM GIS. Existing soil surveys interpretive guidelines are subjective and untested. Improved recommendations and interpretive guidelines are required to derive the greatest benefit from land resource inventories.

Land use surveys are needed to monitor land use change and to evaluate appropriate land use systems.

Soil degradation research is required to evaluate existing erosion models under Nova Scotia conditions, to demonstrate the impact of erosion on crop yield, to document the cost benefits of various soil conservation options, to establish the most effective method(s) of evaluating soil compaction, and to investigate the rate of organic matter loss and soil structure degradation under intensive cropping systems.

Water quality research is required to assess the impact of farming practices on the nutrient and pesticide content of surface runoff and subsurface water from tile drainage systems.

1.9.6 OTHER ITEMS

The province has entered into a Canada/Nova Scotia Agreement on the Agricultural Component of the Green Plan. The agreement has three component programs:

- 1. Sustainable Agricultural Awareness and Communication
- 2. Agricultural Resource Management
- 3. Agricultural Waste Management

Efforts are under way to encourage and assist in the development of specific proposals for funding under this agreement.

Reduced consideration for soil inventory have been reflected in the advisory committee system in the Atlantic Region with the assimilation of the Advisory Committee on Soil Survey with the Advisory Committee on Soil Resource Management.

1.10 PRINCE EDWARD ISLAND - D. HOLMSTROM

1.10.1 ACTIVITIES

 Transfer of the 1:10000 digital map information from CLBRR, Ottawa to the Province of P.E.I. has begun and is planned to be completed March 31, 1993.

 Continuation of the Benchmark Study headed by Dr. C. Wang, CLBRR. Two sites have been established. Sampling is continuing.

Two sites have been established. Sampling and data analysis is continuing.

3) Initiation of a Benchmark Study at Harrington Farm. Six sites have been selected. The sites will be sampled in 1992 and again in 1997. In addition, the field boundaries will be digitized for the Harrington Farm. Data will be collected on soil and crop management.

1.10.2 CONCERNS

In regards to soil survey, there are no direct concerns. The main issues in P.E.I. are soil erosion, soil compaction and poor structure and/or low organic matter. The application or interpretation of existing soil survey data for these issues remains to be completed. The transfer of the 1:10000 soils information will permit some interpretations, however, a GIS workstation is required to make full use of the available data.

1.11 NEWFOUNDLAND - E. WOODROW & J. VAN DER HULST

1.11.1 LAND RESOURCE SURVEYS

Due in part to new program reorientation, staff cutbacks, completion of broad scale surveys and low demand for more broad scale surveys in Newfoundland, no new surveys were started by the federal soil survey during the past year. However, the province did receive requests for detailed soil survey information in several areas of land use conflict:

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Musgravetown, Lethbridge being worked on a piece meal basis. As a request comes in, it is handled mainly as part of the on-farm mapping program.

On-farm Mapping Program is no. 1 priority with the province. To date, 35 farms have been started. They range in size from 25 - 300 ha. The work on these is about 50% complete.

St. John's Area - This area was mapped in 1987 at a scale of 1:12,500. Twelve maps were produced. Due to land use conflicts, this survey is being updated.

As part of the on-going clean up of backlog soil survey reports and maps, several Exploratory and Reconnaissance soil survey reports and maps were published. Some of these have been around for too long and it is hoped that the remaining few will be published in the near future.

Completed maps and data files of both Soil Carbon and Soil Landscapes of Newfoundland and Labrador.

Compilation of Ecological Stratification Project Maps showing Land Resource Regions and Land Resource areas of Newfoundland and Labrador.

1.11.2 INTERPRETATIONS

The province is very interested in the next few years in working on an interpretation system for Agriculture for the whole island. A rating system for forages and pasture is working well on the Avalon Peninsula, however, one has to consider regional differences when considering the whole island.

In cooperation with the Forest Inventory Section of the Provincial Department of Forestry and Agriculture, assistance was given to field crews who were involved in forest site classification. Instruction was given on describing, sampling and classifying soils to help classify forest sites. One of the big advantages that I see from this for us (not to mention the spirit of co-operation) is the fact that we get an average of 200 soil profile samples collected randomly throughout the forest management units where forest inventory sample plots are located. The data from these samples has a lot of future potential as far as updating CanSIS data files, updating soil carbon file, to name but a few.

The crop suitability rating system for rating vegetable crops on organic soils in Newfoundland has been published.

1.11.3 RESEARCH AND MONITORING

Newfoundland has only a small amount of land that is suitable for farming, in comparison to mainland provinces. Any degradation or loss of soil in this province is extremely important because of the scarceness. We are pleased to announce that we have established a benchmark site to monitor soil quality in the province.

Our current research and monitoring work being carried out involves the environmental impact and soil conservation assessment of agricultural activities in Newfoundland. Projects include:

- 1) Evaluation of soil quality loss
- On-farm conservation practices and demonstrations
- 3) Soil organic matter
- Effects of land clearing practices on soil physical properties
- Effects of manure applications on soil and groundwater quality of major agricultural soils
- 6) Evaluation of subsurface drainage (tile drainage) in selected agricultural soils

1.11.4 OTHER PROGRAMS

In cooperation with the Agri-Food Development Branch and under the Green Plan, the Land Resource Division of CLBRR and the Soil and Land Management Division of the Provincial Department of Forestry and Agriculture have been proposing studies to look at the effects of fertilizer on the quality of groundwater supply, the effects of soil amendments on soil quality and plant quality and growth. This would be a continuation of some of the work started under the National Soil Conservation Program.

1.11.5 CONCERNS

We have a lot of work to do in Newfoundland but very little staff to carry it out.

A change in priorities and overall reductions and cutbacks have resulted in a decrease of Land Resource Division staff in Newfoundland to one person. Funding reductions have made it necessary to spend time negotiating for soft money to complete work priorities. It is very important for Land Resource Division to maintain a presence in Newfoundland to continue ongoing projects, to contribute to negotiation and implementation of Soil and Water agreements and to act as CLBRR's representative.

1.12 GEOLOGICAL SURVEY OF CANADA, ENERGY, MINES AND RESOURCES -R.J. FULTON

1.12.1 INTRODUCTION

This report is referred to as being from Energy, Mines and Resources but in fact it is only for the Geological Survey of Canada and specifically for Terrain Sciences Division, GSC. Three items have been chosen which might be of interest to the Expert Committee. First, the GSC is planning on getting into Groundwater Research once again, second we have a relatively major Global Change Program, and finally we are working on enhancing our geological mapping capabilities through a new program referred to as NATMAP.

1.12.2 GROUNDWATER INITIATIVE

The Geological Survey of Canada played a major role in groundwater research until the mid 1960's when the Department of Environment was set up. To give the new department some weight it was decided that all so called "wet" Federal activities would be placed in the new department. Hence we lost groundwater. Over the past several years there has been considerable pressure from outside to have us re-enter the groundwater research field. A committee is currently preparing plans for the new unit which in all likelihood will be housed in Calgary. Few details are available but one suggestion that was that the group look into hydrogeology research related to salinization on the Prairies.

1.12.3 TERRAIN SCIENCES GLOBAL CHANGE ACTIVITIES OVERVIEW

At present much of the Terrain Sciences Division program is being packaged in terms of Global Change and the environment. Most of our efforts are directed towards 3 main projects that are referred to as IRMA's (Integrated Research Monitoring Areas). The idea in each of these is to obtain base line information on the present geological-environmental conditions so that through a monitoring program we will be able to measure changes in local process activities which might be tied to global change. In addition, we are attempting to tie evidence of past geological process activity to past climates so it might be possible to predict the future levels of process activity. The three areas selected as "IRMA's" are a small drainage basin on Ellesmere Island, the Mackenzie Valley Corridor, and the Palliser Triangle. The one which I know the most about and which is probably of most interest to you is the Palliser Triangle Project.

1.12.4 PALLISER TRIANGLE GLOBAL CHANGE OBSERVATORY

The Palliser Triangle is the driest part of the Canadian Prairies. This area was chosen as a research and monitoring area because it was reasoned that if climate warmed and became drier, this would be one of the first places in Canada where stress would be felt. A prime objective of our work is to learn more about the natural cycle of drought in the Prairies. We plan on studying sediment cores from a number of lakes to learn more about the natural cyclicity and severity of droughts. This will give us an idea of what to expect in the future. A second objective is to look at past process activity (such as fluvial and wind erosion) and attempt to tie different levels of activity to particular climatic conditions. This should give us information which will help predict the change of processes which might accompany a given climatic change. The third aspect of the study is monitoring. What we hope to do here is to set up long term monitoring programs at several natural sites. The idea is to gather baseline information on what is occurring today so that if the climate changes, we will be able to monitor the change which occurs in geologic processes. This project is just getting underway. Cores have been collected from several lakes but extensive studies have not yet been conducted. We still must select our monitoring sites. Not only do we want natural sites but we want sites where there is some guarantee of consistent land use. Suffield Military Reserve, Grasslands National Park and provincial parks and recreational reserves are high on our list of candidate areas. We have considered trying to piggy back on the soils quality monitoring sites but it is our understanding that these are all cultivated. Don Acton attended our organizing meeting last November and is our contact with the Soil Survey.

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1.12.5 TERRAIN SCIENCES NATMAP ACTIVITIES OVERVIEW

Another recent activity of interest is the Geological Survey of Canada National Mapping Program (NATMAP). Over the past decade or more we have watched the percentage and absolute amount of resources devoted to geological mapping decrease. This is alarming because whenever we do a user survey the message is that we should be increasing our mapping and in addition, we feel that it is the most important component of our work. A couple of years ago the decision was made to setup a special program to divert more resources into mapping. A special mapping fund has been designated and a committee has been set up which includes users and geologists from outside the Geological Survey. The idea is to fund work that otherwise would not be done, with emphasis on projects which use innovative techniques.

1.12.6 PRAIRIE NATMAP

Several NATMAP funded projects have been developed around the country; the one of most relevance to the Expert Committee is the Prairie NATMAP project. Under this, we are mapping an area in southeastern Manitoba and the Virden map sheet which is in southwestern Manitoba and southeastern Saskatchewan. Aspects of this work which interested the NATMAP committee are the database files which we are developing. We plan one database for subsurface information (all the water well records) and one for surficial and mapping information. The two will be part of a GIS package which will be used to present and manipulate the surficial geology information. So it would appear that we are where the Soil Survey was 15 or more years ago when it was decided that the computer was the way to go for soils data storage and retrieval. We are much more fortunate than you were when you started however, as we can follow your path and now the necessary software and hardware can pretty much be bought off the shelf. We just started on this project in July so there is little to report.

This has been a very brief run down of items of potential interest which are taking place in the Geological Survey of Canada, primarily in Terrain Sciences Division. If you would like more information on any of the topics mentioned I will attempt to put you in touch with some one who can supply details.

1.13 FORESTRY CANADA - OLE HENDRICKSON

The Forest Site Classification Working Group of Forestry Canada is implementing a Green Plan initiative on "Ecological Land Classification". This is a relatively small (\$100 K in FY 1992-93) program, led by Richard Sims (Ontario Region). However, it is linked to a much larger (\$5 M in FY 1992-93) Model Forests program. Ten Model Forests have been selected, broadly representing the diversity of forest regions across Canada. They are found in eight different provinces (excluding Nova Scotia and Prince Edward Island), and represent large scale (> 500 K ha) working models of best forestry practices. Various partners (forestry corporations, private land owners, provincial forestry agencies, aboriginal groups, naturalist groups, national parks, etc.) participate in setting management goals and methods for each Model Forest. Ecological land classification has been identified as a priority activity in several Model Forests. This will likely involve field surveys of soils and vegetation (probably done on a contract basis). Data will be assembled in a GIS format for use in "Decision Support Systems" to plan wildlife management activities, road design, harvest and site preparation methods, and so forth.

A recent accomplishment of the Forest Site Classification Working Group is publication of a series of papers reviewing provincial site classification systems (Forestry Chronicle, February 1992). This volume illustrates both a diversity of approaches to forest land classification, and some commonalities. As noted by Stan Rowe in his prologue to this volume, some jurisdictions (e.g., Quebec) place more effort on mapping of forest landscapes (regionalization) and others on grouping of similar forest land units (classification). Several provinces that emphasize classification have chosen to group forest sites into operational units occupying similar positions on a two-dimensional grid of moisture and nutrients.

Members of the Forest Site Classification Working Group are playing a small role in a program to finalize the boundaries of the "Terrestrial Ecoregions of Canada". This ecological stratification program, led by the State of the Environment Reporting Service of Environment Canada, will produce a national regionalization system with a hierarchy of levels nested within one another. The Working Group plans to use the new system to produce base maps for regional forestry interpretations.

The Forest Site Classification Working Group is also planning a national conference on forest land classification to be held in 1993. It should provide an opportunity to discuss common approaches to ecological land classification and evaluation across the country. Another Forestry Canada Green Plan initiative, led by Mike Apps (Northwest Region), is on climate change. In preparing a carbon budget for Canada's forest sector, a need for better data on forest soil carbon pools has been identified. This might be addressed by combining Agriculture Canada's soil carbon data collected in conjunction with the national soil landscape maps with Forestry Canada's data on aboveground biomass carbon pools.

Apart from Green Plan funding, a new round of federal-provincial forestry agreements is also providing support for forest land classification systems. Forestry Canada scientists are helping the province of Manitoba develop a new system that will combine features of existing classifications for Alberta and for northwestern Ontario. Wetlands mapping and classification also continues to be a priority activity for Forestry Canada scientists, and some have submitted research proposals under the new agreements.

At the 1990 ECSS meeting, I was asked to report back on whether the working group on forestry interpretations should be maintained. The demand for forest soil surveys and interpretations is growing steadily, e.g., for developing and applying ecological land classification systems. However, there are no federal personnel currently responsible for meeting this demand. The continuation of the ECSS forestry interpretations working group, however desirable, is not warranted.

1.14 INLAND WATERS DIRECTORATE, ENVIRONMENT CANADA - R. HÉLIE

The Inland Water Directorate (IWD) is undergoing reorganization. In response to Green Plan directives pertaining to an ecosystems approach and DOE's transition team's efforts to integrate our research and monitoring efforts within a similar framework, we have reorganized IWD. The new organization has been named *Ecosystem Sciences and evaluation Directorate (ESED)*. In addition to the traditional drainage basin framework the Directorate has adopted an ecosystem approach to support it's monitoring activities. We have integrated our water quantity and water quality network coordination into a single Branch.

We are working with Agriculture Canada, in cooperation with SOER, to establish a common ecological framework at the region level for the whole country. ESED is assisting AgCan Quebec region in the elaboration and documentation of Soil Landscape Units (SLCs) and generalized Land Resource Areas (LRAs) and Land Resource Regions (LRRs).

1.15 PRAIRIE FARM REHABILITATION ADMINISTRATION - W. HARRON

1.15.1 NATIONAL SOIL CONSERVATION PROGRAM (NSCP)

PFRA has been administering Federal components of NSCP agreements in Manitoba, Saskatchewan, Alberta and the Peace River Region of British Columbia. Activities that relate to soil inventory include:

- Salinity Investigation Manual, prepared by Alberta Agriculture - completed in March, 1992.
- · Soil Erosion Risk Mapping in Manitoba. Floyd Wilson is preparing erosion risk maps as an overlay on Landsat imagery. There prepared for maps are the rural municipalities and distributed to landowners an awareness tool for residue 28 management.
- Universal Soil Loss Equation (USLE) plots in Manitoba are continuing with an expansion of the work to include subwatershed monitoring.
- The University of Saskatchewan has been contracted to prepare snowmelt factors for the USLE.
- The Canadian Highly Erodible Land Planner (CanHELP) for planning wind erosion control measures is being improved for easier use. CanHELP 3.0 is to be released in November 1992.
- PFRA is supporting a proposal by the Saskatchewan Research Council (SRC) to prepare a landcover map for Saskatchewan. This work is expected to be done in 1994.
- PFRA is supporting an LRD project identifying Farm Management Activities on a landscape basis from the 1991 Agricultural Census.
- PFRA has been involved in many of the Soil Quality Evaluation Program (SQEP) activities.

An additional \$600,000 was contributed from the local delivery groups in Saskatchewan to extend the

soil survey work. These funds will allow the mapping of six rural municipalities in the Yorkton area and five rural municipalities in the Kindersley area over the next two years. This action shows that there is support by the producer groups in Saskatchewan for the Rural Municipality based soil survey information.

1.15.2 PERMANENT COVER PROGRAM (PCP, PCP II)

The Permanent Cover Program (Conservation Care Program in Manitoba) was initiated in 1989 as a component of NSCP. This program provided a payment to producers to seed land that is marginally suitable for annual cultivation and is subject to soil degradation to a permanent cover crop. The producer is then allowed to use the land for grazing, hay production, or other uses, including agroforestry.

The PCP has proven to be a popular program and has been extended in PCP II under the Farm Support Adjustment Measures (FSAM) program. In all, 1.0 million acres have been enroled in the program. Preliminary estimates indicate that PCP may result in savings to the Federal government of up to \$23 million annually through reduced payments under GRIP, NISA, WGTA, crop insurance and related programs. Additional savings may be realized by the provinces and by reduced costs of soil degradation to producers.

PCP has depended on land inventory to target the lands that are marginal for annual crop production (CLI, classes 4, 5 & 6). Similar land based programs will need the support of comprehensive land inventory to effectively focus the objectives of the programs to appropriate lands.

1.15.3 ENVIRONMENTAL SUSTAINABILITY INITIATIVE (ESI)

ESI was intended as a one-year program to bridge NSCP and Green Plan activities. PFRA was responsible to deliver the Federal component of ESI which amounted to \$9.4 million in cost shared agreements with the three Prairie provinces. The program addressed the broader issues of environmental sustainability identified in the Agriculture Policy Review and the Green Plan and to develop new partnerships. The 107 projects that were supported through the Federal components of ESI attested to success in meeting those objectives.

In Alberta and Saskatchewan, the Land Resources Division of CLBRR was responsible for ten projects amounting to \$476,000 related to SWEP land use and other soil projects. In addition, PFRA had several projects related to conservation planning, soil erosion mapping and soil salinity. Details of ESI projects can be obtained through PFRA.

1.15.4 New DIRECTIONS

Sustainable Land Management will continue to take on broader perspectives in the future. Past soil inventory and classification has generally developed through the need to provide information to cultivate land. The reality, however is that 40% of the agricultural land ins Western Canada is not cultivated. In addition, the impact of cultivation practices on other resources is increasing as an issue. Future needs in land inventory will include interpretations for range management, watershed management for water supply (quality and quantity), aquifer protection, wildlife management, identifying rural development opportunities and ecological land classification.

PFRA continues to support the role of LRD as the source of land inventory information and interpretations of the land for the various uses that will demand attention now and in the future. The provision of basic soil information and interpretations that are based in quality soil mapping, correlation and most importantly dissemination of the information continues to be a need in providing a vision of sustainable land management in Canada.

1.16 DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT -I. SNEDDON

1.16.1 CANADA LANDS NORTH OF 60TH PARALLEL

Canada lands north of the 60th parallel total over 3.9 million sq. km. and constitute almost 40 percent of Canada's land mass and 30 percent of its freshwater area.

Up until now northern Canada consisted of two territories, the Yukon and the Northwest Territories. With the settlement of native land claims extensive areas of land, bigger than some provinces, will come under the jurisdiction of aboriginal peoples.

In addition, the residents of the Eastern Arctic have just voted on a plebiscite that gives their approval for the division of the Northwest Territories and the creation of the new territory of Nunavut. Under the land claims settlements the native people will receive cash settlements, and rights to specified renewable and non-renewable resources, the right to participate on resource management boards and the rights to certain negotiated levels of self government.

Boards that will be established as a result of land claims in each settlement area address land use planning, environmental impact and review, land and water management and surface rights. Native participation on these boards is 50 percent.

Self government addresses such issues as taxation, education, justice, social services, etc.

In addition to its commitment to settle native claims, to meet northerners' wishes on the division of the N.W.T., Canada is also committed to devolution of all provincial type responsibilities from the federal government to the territorial governments. Some transfers have already taken place; others are under negotiation.

The North is undergoing change. Being aware of these changes will provide greater certainty on how business will be conducted in the North in the future.

1.16.2 STATISTICS ON CANADA'S LAND AREA NORTH OF 60TH PARALLEL

i)	Canada lands r	orth of 60th parallel.
		Total Area of Land
	Canada	9,970,610 sq. km.
	N.W.T.	3,372,349 sq. km.
	Yukon	536,130 sq. km.

ii) Area of land north of 60 under selection in Land Claims
Yukon First Nations 41,440 sq. km.
T.F.M. 354,071 sq. km.
Inuvialuit 90,650 sq. km.

170,940 sq. km.

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 iii) Area of Federal and Territorial Lands north of 60 Yukon 494,690 sq. km.
 N.W.T. 2,756,688 sq. km.

iv) Population of N.W.T.

MacKenzie Valley

	Population	Cash Settlement from
		Land Claims
Total	58,000	
Dene/Metis	13,000	\$500 M
Inuvialuit	2,500	\$45 M
Inuit	17,500	\$580 M

v) Population of Yukon Population Cash Settlement from Land Claims Total 26,000

First Nations	10,000	\$243 M

2.1 AGRICULTURAL INTERPRETATIONS WORKING GROUP - W. PETTAPIECE

The group was quite active in 91 with testing and editing of a first draft of the rating system. In 92 the activity was much lower pending reassignment of the Chairman. Specific activities were:

- Jan 91: First Draft Circulated for Testing and Editing
- Feb/Mar 91: Office Testing
- June 91: Compilation of Test Results
- July 91: Meeting of WG in Truro
- Dec 91: Compilation of Second Draft (A. McKeague)
- June 92: Second Draft Completed and Circulated for Review
- Sept 92: Second Draft Edited; 25 Copies for Presentation to ECSS

The report presents a general procedure for the assessment of land for agricultural suitability with specific scales for 1 suite of crops, the spring seeded small grains. As per the objectives, climate and organic soils were integrated into the evaluation. Maps of climatic indices of moisture (P-PE) and heat (EGDD) will be at a scale of 1:7.5M for the report but with 1:1M provincial/regional maps available on request. The organic rating uses the same approach and format as that for mineral soils. This is a major change from previous schemes and will require further testing.

The plan is to finalize this report as a "working document", get it translated, and publish with 2000 copies in English and 200 copies in French. We would like to include an acknowledgement of the ECSS and would like some direction as to content and format of such a statement.

Feedback has been quite positive with some reservation pending wider testing and application.

RECOMMENDATION #1

That the ECSS accept and support this report as a national approach for assessing land suitability for small grains and that the ECSS promote its use as a standard procedure.

RECOMMENDATION #2

That the present working group be dissolved with the understanding that the national applications specialist in CLBRR will act as a contact to receive comments and to implement amendments.

RECOMMENDATION #3

That a new Applications Group be established, comprised of provincial/regional representation, for the purpose of evaluating present procedures, identifying application needs and providing direction for research priorities. (This would be an advisory group providing regional contact rather than a problem solving working group.)

Report prepared by W. Pettapiece on behalf of the Working Group

(D. Holmstrom, M. Nolin, R. Smith, G. Padbury, M. White, A. Bootsma)

2.2 CANSIS/NSDB WORKING GROUP -K.B. MACDONALD

2.2.1 ACTIVITIES OVER PAST YEAR

This working group has not met mainly because the position of Head of CanSIS was vacant.

2.2.2 FUTURE ACTIVITIES

After the position of Head of CanSIS is filled and the incumbent has had a chance to become familiar with the operation, a meeting of the CanSIS Working Group will be convened. The need for this meeting was identified in a memo to the head of Program 1 earlier this year and tentative approval was given. Over the next year it is anticipated that the CanSIS Working Group will review the operation of the NSDB and the data file structures and will identify areas for research and development.

2.3 SOIL CLASSIFICATION WORKING GROUP - C TARNOCAI

2.3.1 INTRODUCTION

Because of budgetary restraints, the Soil Classification Working Group (SCWG) concentrated its efforts only on the development of a classification for soils with vertic properties. This involved meetings and field tours in the various parts of Canada where these soils occur. Other soil classification problems, such as the chemical criteria relating to the classification of Podzolic soils and the classification of organic horizons, that were identified in the working group's plan of activities, had to be postponed.

This report gives a brief description of the SCWG's activities and the results of the activities carried out during the past two years.

2.3.2 WORKING GROUP MEETINGS

During the past two years, meetings and tours were held to develop a classification for soils with vertic properties. These tours took place in western Canada since these soils occur primarily in this region.

In 1991 a soil tour was held in Manitoba and Saskatchewan (Stonehouse 1991). It quickly became evident during this tour that some soils were distinctly Vertisols, displaying all the vertic properties, while other soils were dominated by diagnostic features of other soil orders, but also exhibited some vertic properties. Option two of Stonehouse and Mermut's (1990) proposals was found to be best suited for handling this complex situation.

In 1992 a similar tour was held in Alberta and British Columbia and a number of soils with vertic properties were examined in different regions of these provinces (Brierley 1992, Luttmerding 1992). During the meeting held in Edmonton at the end of this tour, the working group concluded that a modified version of option two (Stonehouse and Mermut 1990) should be adopted for the classification of these soils. This option calls for the establishment of a Vertisolic Order and the recognition of vertic intergrades in other orders.

2.3.3 CLASSIFICATION OF VERTISOLS

The Vertisolic Order, the proposed tenth soil order in the Canadian System of Soil Classification, would include those soils displaying vertic turbation and slickensides in the control section. Vertic turbation mixes the soil materials and prevents diagnostic horizon development. A brief outline of the classification of the Vertisolic Order is as follows:

Order	Great Group	Subgroup
Vertisolic	Brown Vertisol	Orthic Brown Vertisol
	21 	Rego Brown Vertisol
		Gleyed Brown Vertisol
		Gleyed Rego Brown Vertisol
	Dark Brown	Orthic Dark Brown Vertisol
	Vertisol	Rego Humic Brown Vertisol
		Gleyed Dark Brown Vertisol
		Gleyed Rego Dark Brown
	<u>ē</u>	Vertisol
	Black Vertisol	Orthic Black Vertisol
		Rego Black Vertisol
		Gleyed Black Vertisol
		Gleyed Rego Black Vertisol

Soils having diagnostic horizons of other orders as well as vertic properties are recognized as intergrades in other soil orders. They are classified as follows:

Order	Great Group	Subgroup
Chernozemic	Brown	None
	Dark Brown	None
	Black	Vertic Black
		Gleyed Vertic Black
	Dark Grey	Vertic Dark Gray
*	New York, Street,	Gleyed Vertic Dark Gray
Luvisolic	Gray Brown	Vertic Gray Brown Luvisol
	Luvisol	Gleyed Vertic Gray Brown Luvisol
	Gray Luvisol	Vertic Gray Luvisol
		Gleyed Vertic Gray Luvisol

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Subgroups may be required in other soil orders, especially the Gleysolic, Regosolic and Solonetzic orders.

2.3.4 ACTIVITIES DURING THE NEXT TWO YEARS

A report will be produced containing detailed descriptions of the Vertisolic Order and the vertic intergrades of other orders. Definitions of the slikenside (ss) and vertoturbic (v) horizons and examples of the morphologies, and physical and chamical data for selected Vertisolic pedons will also

chemical data for selected Vertisolic pedons will also be included. This report is to be completed by May of 1993 and will then serve as the basic document for testing this classification. At the end of the test period, probably in 1994, this classification will be finalized and presented for acceptance to the ECSS. In addition, a small group of pedologist will visit the clay soil areas in Ontario and Quebec to examine these soils and test the proposed classification.

2.3.5 RECOMMENDATION TO ECSS

It is recommended that the ECSS accept the classification for soils with vertic properties for testing as outlined herein by the Soil Classification Working Group.

2.3.6 REFERENCES

- Brierley, J.A. 1992. Vertisolic soils tour, Alberta portion. Alberta Land Resources Unit, Edmonton, Alberta, 42 p.
- Luttmerding, H.A. 1992. Vertisolic soils field tour, British Columbia portion. Integrated Management Branch, B.C. Ministry of Environment, Lands and Parks, Victoria, B.C., 51 p.
- Stonehouse, H.B. 1991. Vertisol soils tour, Saskatchewan portion. Agriculture Canada, Saskatchewan Soil Survey Unit, Saskatoon, 25 p.
- Stonehouse, H.B. and A.R. Mermut. 1990. Proposal for the classification of soils with vertic properties in Canada. Agriculture Canada, Saskatchewan Soil Survey Unit, Saskatoon, 29 p.

2.4 SUMMARY OF WORKING GROUP RECOMMENDATIONS

2.4.1 AGRICULTURAL INTERPRETATIONS WORKING GROUP RECOMMENDATIONS

- That the ECSS accept and support this report as a national approach for assessing suitability for small grains and that the ECSS promote its use as a standard procedure.

The motion to accept this recommendation was carried by the ECSS.

- That the present working group be dissolved with the understanding that the national applications specialist in CLBRR will act as a contact to receive comments and to implement amendments.

The motion to accept this recommendation was carried by the ECSS.

- That a new Applications Group be established, comprised of provincial/regional representation, for the purpose of evaluating present procedures, identifying application needs and providing direction for research priorities. (This would be an advisory group providing regional contact rather than a problem solving working group.)

The motion to accept this recommendation was carried by the ECSS.

2.4.2 CANSIS WORKING GROUP RECOMMENDATIONS

- Subsequent to filling the Head of CanSIS position. To review the operation of the NSDB and the data file structures, to identify priority areas for research and development, and to coordinate GIS user applications between NSDB and the regional units.

The motion to accept this recommendation was carried by the ECSS.

2.4.3 SOIL CLASSIFICATION WORKING GROUP RECOMMENDATIONS

 That the ECSS accept the classification for soils with vertic properties for testing as outlined herein by the Soil Classification Working Group.

The motion to accept this recommendation was carried by the ECSS.

2.4.4 FORESTRY WORKING GROUP RECOMMENDATIONS

- Whereas the demand for soil survey and interpretations is growing steadily as is the development and application of ecological land classification systems and whereas there are no federal personnel currently responsible for meeting this demand, it is recommended that the continuation of the ECSS Forestry Interpretations Working Group, however desirable, is not warranted.

The motion to accept this recommendation was carried by the ECSS.

3. REPORTS OF RELATED STUDIES

3.1 OVERVIEW OF LAND RESOURCE DIVISION, CLBRR - D. COOTE

3.1.1 PROGRAM REVIEW

The Land Resource Division of the Centre for Land and Biological Resources Research has three programs: I Land Resource Data and Applications (Program Leader D. Coote); II Sustainable Land Productivity (Program Leader J. Culley); and III Environmental Quality (Program Leader S. Khan). Each Program can be subdivided into Studies, which are grouped together into related Study Groups:

PROGRAM I:

Study Group: Soil Resource Information

Study 9101 - Soil Correlation and Standards (D. Coote)

Study 9102 - Soil Taxonomy (C. Tarnocai)

Study 9103 - National Soil Inventory (J. Shields) Study 9104 - Provincial/Territorial Soil Inventory (D. Coote)

Study 9105 - CanSIS/National Soil Data Base (NSDB) (C. MacDonald/Acting)

Study 9106 - Standard Products/Technology Transfer (H. Rostad)

Study Group: Ecological Interactions

Study 9111 - Agroecological Stratification (S. Smith)

Study 9112 - Pedological Processes (C. Tarnocai) Study 9136 - Soil Quality Change (C. Wang)

Study 9113 - Land Resource Data Applications (W. Pettapiece)

Study 9114 - GIS Procedures (C. MacDonald/Acting)

Study 9115 - SQEP Database Integration (B. MacDonald)

PROGRAM II:

Study Group: Evaluation of Land Management Strategies

Study 9127 - Land Use Analysis and Monitoring (J. Hiley)

Study 9128 - Land Evaluation for Sustainability (J. Dumanski)

Study 9121 - SQEP Coordination (D. Acton)

Study 9122 - Water Erosion (G. Wall)

Study 9123 - Wind Erosion (G. Padbury)

Study 9124 - Soil Salinity Assessment (R. Eilers)

Study 9125 - Soil Structure Dynamics (C. Topp)

Study Group: Land Management

Study 9126 - Crop Adaptation to Soil and Climate Stresses (L. Dwyer)

PROGRAM III:

Study Group: Soil Quality

Study 9133 - Soil Processes and Properties (E. Kodama)

Study 9134 - Soil Organic Matter and Composting (E. Gregorich)

Study 9135 - Pesticides in Soils (R. Behki)

Study 9137 - Soil Quality Standards (G. Coen)

Study Group: Effect of Agricultural Practices on Air and Water Quality

Study 9131 - Agrochemical Processes and Transport in Water (J. Millette)

Study 9132 - Greenhouse Gases and Toxic Substances in Air (R. Desjardins)

3.1.2 PROVINCIAL/TERRITORIAL SOIL INVENTORIES

1. All Provinces:

Maintain correlation and quality control function in relation to all soil mapping activities. Progress - this has been summarized previously in the Provincial Reports.

2. Alberta:

Mapping of County of Forty Mile and MD of Rockyview completed by ARC under NSCP funding, with correlation support from Studies 9104 and 9101. Gleichen soil maps correlated with legend, printing delayed due to lack of funds. St Paul report being edited (map already printed). Soil inventory related NSCP, PARI and Green Plan proposals have been prepared (soil information systems), and staff have participated on Management Committees.

3. Saskatchewan:

Mapping in southwestern and central Saskatchewan has proceeded rapidly, with maps and reports for a total of 13 RMs (mapped in 1991) now published, and field work completed for another 13 RMs.

4. Manitoba:

The resurvey of N. Cypress and Strathcona RMs is on schedule this season. The Grand Rapids report has been finalized, but not yet printed.

5. Ontario:

Remapping and preparation of interim maps for Kent County has been done. Printing proofs and digital databases of the 4 maps of Brant County have been edited and updated, respectively.

6. Quebec:

Field mapping of La Prairie has been completed, but map cannot be finalized until soil sampling completed next year. Project plans for St. Jean, Iberville and Napierville will be prepared before end of year. Report for Rouville is in process (including maps and databases).

7. New Brunswick:

Mapping of one of two map sheets planned for the Woodstock area has been completed. Preparation of a draft report for Vol. 3 of the Woodstock-Florenceville soil survey is on schedule. Work on the soil survey of Central and Northern new Brunswick has been postponed; soil carbon data base and Shediak Parish of Westmoreland County have largely replaced the proposed Northern N.B. inventory.

8. Nova Scotia:

Kings County report has been drafted, but still needs editing.

9. Other Provinces:

These had no specific goals under this study this year, other than the continuation of correlation and liaison activities.

3.2 NATIONAL SOIL INVENTORY STUDY -J. SHIELDS

3.2.1 INTRODUCTION

A few years ago, this Centre undertook to compile a computerized data base to record the attributes for soil and land for the whole country and to prepare maps from this information at a scale of 1:1 million. To achieve this goal, a standardized map legend describing permanent soil and landscape attributes was developed by a national ECSS working group. This legend can accommodate information recorded by all major soil mapping systems used across Canada.

3.2.2 GENERAL LEGEND CONCEPTS

 The maps are comprised of map delineations called polygons, each of which is described in terms of a standard set of attributes.

- The full array of polygon attributes that describe a distinct type of soil and its associated landscape attributes, such as surface form, slope, water table and permafrost is called a soil landscape.
- These attributes are those considered most important to:
 - · Plant growth
 - General land management, regional planning
 - Terrain sensitivity, environmental sustainability
- A polygon may contain one or more distinct soil landscape components (dominant, subdominant, inclusion):
 - Dominant represents at least 40% of polygon area
 - S u b d o m i n a n t represents 16 to 39% of polygon area
 - Inclusions represent a maximum of 15% of polygon area
- The minimum size of a polygon should be 1cm x 1cm at 1:1 million scale (100 sq. km)
- Each polygon is assigned a unique identifying number

3.2.3 MAP COVERAGE TO SEPTEMBER 30, 1992

- National coverage except part of BC/North
- Map coverages which are:
 - Printed: AL, SK, MN, ON/S, QU/SW, NB, PE, NS, NF/S
 - Cartographic map production: YU, BC/S, QU/SE, QU/C
 - Compiled: NF/N, NW 1-10
 - Not yet compiled: Part of BC/N

3.2.4 ATTRIBUTE LIST

- Those that differentiate (or separate) one polygon from another:
 - Soil development
 - Soil texture class group of parent material
 - · Soil parent material mode of deposition

- Local surface form
- Slope gradient class
- Kind of rock or other surface material except water
- Spatial occurrence of above attributes within polygon
- Note: These attributes also comprise the map symbol.

3.2.5 POLYGON ATTRIBUTE TABLE (LANDSCAPE.PAT) FILE (FOR ALL DIGITIZED COVERAGES)

Created by the ARC/INFO software, plus other soil landscape attributes which apply to the entire polygon.

- Area Square metres from software
- Perimeter from software
- Landscape # software internal number to maintain topology
- Landscape-ID NSDB assigned number equivalent to polynumb
- Provincial code
- Sheet number
- Polygon number
- Ecoclimatic region
- Complexity

3.2.6 COMPONENT FILE - FOR ALL COVERAGES IN CANADA EXCEPT BC/N

- Province
- Sheet number
- Polygon number
- Component of polygon (DOM, SUB, Inclusion, Water, Urban)
- Component number
- Percent of polygon occupied by component
- Soil development
- Soil parent material mode of deposition
- Local surface form
- Slope gradient class
- Kind of soil, rock outcrop or other material at surface
- Coarse fragment content
- Rooting depth, unrestricted
- Drainage class
- Calcareous class of parent material
- Vegetation cover and/or land use class
- Soil code
- Modifier

3.2.7 ADDITIONAL ATTRIBUTES RECORDED IN DOMINANT AND SUBDOMINANT SLC FILES (FOR YUKON AND PROVINCIAL COVERAGES EXCEPT QU/N AND BC/N)

- Percentage distribution of soil landscapes
- Regional landform
- Parent material texture
- Surface texture of mineral soil to 15 cm
- Kind of compacted, consolidated or contrasting layer
- Depth to compacted, consolidated or contrasting layer
- Available water holding capacity in upper 120 cm
- Depth to water table
- · Dominant type of ice
- Ice content
- Permafrost occurrence
- Depth of active layer in permafrost soils
- · Kind of patterned ground
- pH of upper 15 cm of soil horizon (CaC12)
- pH of upper 15 cm of soil horizon (water)
- Nitrogen content of upper 15 cm of soil
- Thickness of humus layer
- Inclusion 1
- Inclusion 2
- Lake size
- Water bodies wholly contained in polygon (percent)

Chaine (Chaine)

- Reliability class
- Soil name 1
- Soil name 2
- Area in kilohectares

3.2.8 PRODUCTS

The digital maps themselves and the digital attributes of every polygon are stored in the National Soil Base (NSDB) of CANSIS.

Item	Format		
-	Hard Copy	Digital/Electronic	
Мар	Printed	NSDB	
Photo Plate (Regional)	Printed		
Report (Legend Subset)	Printed		
Project Pedigree File	Report	Read-Me	

- 1. Soil Landscapes of Canada (SLC)
 - Polygon Attribute Table (Landscape.Pat) File
 - Component File (all coverages except BC/N)
 - Read-Me File, Notes, Validation Procedures, Citations
 - Appendix A-1 SLC Procedures Manual
 - Appendix A-2 Additional attributes and classes required to satisfy the national coverage
- Dominant and Subdominant Detailed Legend Files (Yukon and Provincial Coverages Except QU/N, BC/N)
 - Read-Me File, Notes, Validation Procedures, Citations
 - Based on and linked to SLC Digital Map Polygons
- 3. Data Bases Related to SLC
 - 3.1 Soil Carbon Layer File
 - (All coverages except BC/N)
 - Read-Me File, Notes, Validation Procedures, Citations
 - Based on and linked to SLC Digital Map Polygons
 - 3.2 Water Erosion
 - 3.3 Wind Erosion
 - 3.4 Soil Salinity

3.2.9 PRODUCT USAGE

Products are most commonly used as the spatial basis for:

- Soil carbon data base
- Soil degradation maps (wind, water, salinity)
- Ecological stratification map themes
- Soil quality evaluation studies
- Areas vulnerable to groundwater contamination by pesticides
- Application of successful research findings to other areas with similar attributes
- International soil correlation map products
- Incidence of lightening strikes causing forest fires

3.2.10 CLIENTS

- National Federal and Provincial Government Agencies
 - Department of Environment: National Parks System Branch

Commercial Chemicals Branch

- Nova Scotia Department of Agriculture: Plant Industry Branch
- Alberta Department of Forestry, Lands and Wildlife Reforestation and Reclamation Branch
- Universities
 - Natural Resources Division, Agricultural Economics, Environmental Studies, Soil Testing, Library: University of Manitoba
 - Department of Geography, University of Waterloo
 - University of Washington Library, Seattle
 - Soils Professors, Nova Scotia Agricultural College
- Private Enterprise
 - Ontario Hydro
 - Hydro Quebec
 - Dow Chemicals Canada
 - United Grain Growers
 - Ducks Unlimited
- International Clients
 - India National Bureau of Soil Survey and Land Use
 - Dupont, Agricultural Chemicals Dept., Delaware, U.S.A.
 - Department of Agronomy, University of Illinois
 - Student Thesis, Germany F R

3.3 SOIL CORRELATION AND STANDARDS STUDY - J. SHIELDS

3.3.1 BACKGROUND

- Historically, national and regional correlation has been provided by Research Branch correlators working cooperatively, but having no direct line authority, with provincial correlators, project leaders and mappers.
- The participation of Research Branch mappers in provincial survey projects has not only served to provide a federal presence during field mapping activities but has also contributed greatly to the acceptance of the national standards developed by ECSS Working Groups and implemented by regional and provincial correlators.
- The continued presence of Research Branch mappers at the field mapping level is crucial to the continuation of effective regional correlation.

3.3.2 SOIL CORRELATION TOOLS

Soil inventory requires correlation activities to maintain consistency and to ensure the application of national standards and procedures. These standards are embodied in such manuals as:

- The Soil Survey Handbook
- Soil Mapping System for Canada
- Canadian System of Soil Classification
- CanSIS Manual for Describing Soils in the Field
- Analytical Methods Manual
- Soil Names File
- Project-Correlog Forms

Consistently named, classified and mapped soils within areas on project maps or on maps within different areas are a prerequisite for consistent interpretation of the information therein on a regional or national basis.

3.3.3 THE PROCESS

- The correlation process begins with the planning phase of each inventory project and continues through to the publication of the report.
- It includes informal quality control and mapping decisions carried by the party leader and other party members during fieldwork under the guidance of the provincial correlator.
- It also includes formal procedures called for in the Soil Inventory Planning and Correlog Forms documenting the description, sampling, analyses and naming of soils.
- Editing soil reports is also a correlation task.

3.3.4 OBJECTIVES OF THE STUDY

- To ensure consistency in mapping, classifying and naming soils and in editing reports by implementing established soil correlation procedures during active soil inventory coverages across Canada.
- 2) To develop new standards or procedures as required for effective and consistent

inventory and management of soil information.

3.3.5 1992 GOALS

- Conduct field reviews, supervise soil sampling, develop map legends, and complete project plan for each new project and correlog for at least one active level for all active mapping project coverages.
- Complete CanSIS soil name and soil layer files for soil names coded in Soil Landscapes of Canada Dom and Subdom files for coverages south of 60 degrees.
- Edit for technical content, the soil inventory reports submitted for publication.
- 4) Publish Reports.
- 5) Evaluation of soil survey upgrade procedures.
- 6) Evaluate adequacy of CanSIS attribute files to satisfy correlation requirements.
- Verify Alberta soil correlation area map and encourage its integration to the Ecological Stratification Study.
- 8) Other related activities.

3.4 ECOLOGICAL STRATIFICATION -S. SMITH

The objective of this project is to produce Land Resource Area (LRA) and Land Resource Region (LRR) maps for Canada by adding ecological information to the Soil Landscapes of Canada map series. Agriculture Canada Land Resource Division staff across the country are preparing maps and accompanying relational databases in collaboration with staff from Environment Canada and PFRA. These map and database products are intended to provide a spatial framework for State of Environment reporting and environmental monitoring.

The LRA maps are displayed at a scale of 1:2M. Differeniating criteria for the establishment of land resource areas include regional landform, surface form, textural group, permafrost (where applicable), soil development and vegetation. These attributes, derived from the soil landscape database, together with the additional climate properties of effective growing degree days and moisture deficit (precipitation minus potential evapotranspiration) define land resource areas. These are formed through the amalgamation of soil landscape polygons.

A top down approach is used to define land resource regions which are best displayed at a scale of 1:5M. We are intending to prepare land resource regions so that they match as closely as possible the Ecological Land Classification terristrial ecoregions. The principle followed in LRR formation is that each be composed of a unique combination of physiography (as defined by Bostock's Physiographic Regions of Canada) and ecoclimate (as defined by Zoltai's Ecoclimatic Regions of Canada).

In order to try and relate small-scale landscape units to the ecological land classification systems, negotiations with provincal and territorial agencies are ongoing. The objective is to establish mutually agreed-upon units at the ecoregion level for the entire country that have direct links to underlying more detailed digital map products.

Funding and support for the project is shared between Agriculture Canada (CLBRR), PFRA and Environment Canada State of Environment Reporting Branch.

3.5 SOIL QUALITY MONITORING PROGRAM (SQEP) - J. CULLEY & D. ACTON

The plan of SQEP was to develop a comprehensive national program to monitor the quality of the agricultural soils of Canada in collaboration with other federal government agencies and departments, the provinces and universities. Its four stated objectives were:

- To develop nationally-accepted standards and criteria for evaluating soil and associated water quality.
- To develop capabilities for monitoring land use and land management in relation to its effect on soil and environmental quality.
- To develop systems that will permit improved regional and national assessments of soil and related environmental quality.
- 4) To provide a basis for evaluating soil quality within the context of environmentally and economically sustainable land management.

3.5.1 PROGRAM PROGRESS

- Progress toward the development of criteria and standards has not proceeded as rapidly as planned. Documents providing the framework for soil quality assessments in Canada and methods for measuring soil quality attributes will be completed by the end of March 1993.
- Capabilities to link land use and 2) management information from the Census of agriculture to biophysical landscape units have been developed for the Prairies, ON, and NS and the 1991 Census data will be available for these provinces linked to the Soil Landscapes of Canada data bases in most instances and to the Agricultural Resource Area data bases in others. A capability to manage these data bases has been developed and a facility to enhance Census information with remotely sensed data will be established by the end of the current program. A preliminary study will be completed to assess existing data bases, such as the NSDB, for making inferences about soil quality.

A network of twenty benchmark sites has been established across Canada which will be used for monitoring soil quality in the future.

The current program is focusing on 3. developing systems for prediction of wind and water erosion and change to soil quality from change in organic matter status, soil structure and soil salinity. Our efforts are closely linked to similar activities in the U.S.A. While progress in model development for erosion and organic matter has not progressed as rapidly as anticipated, our validations and calibrations will be very beneficial in extending these models in Canadian conditions. It should avoid the situation exemplified by the USLE, whereby the inability of the equation to predict erosion on frozen soils has rendered it virtually useless for some parts of the country. It may be five years or more before some of these models are fully operations; however, there are subroutines or components of these models in use already.

A salinity model is being developed (with the University of Saskatchewan) and is being applied to sites in Western Canada. Soil structure activities have focused on developing an "integrating factor" or parameter to estimate the impact of land management practices on soil structure quality. The LEACHM model is being evaluated for assessing effects of nutrient and pesticide use on water quality. However, much remains to be done to apply these site models to landscapes and regions.

Hopefully, the development of these parameters and systems will lead to the eventual identification of early indicators of soil quality change.

4) The current effort will provide better insights into the impact of soildegradation on crop production in some parts of Canada. This will assist us in evaluating the impact of change to soil quality on the sustainability of agriuclture in Canada. The approach taken has involved the development of Farmer questionnaires for the Prairies and PEI. Surveys were undertaken and will be analyzed using expert system software.

3.5.2 FUTURE PLANS FOR THE SOIL QUALITY MONITORING (EVALUATION) PROGRAM

Much work remains to be done to identify soil quality indicators and criteria. Beyond this is the need to develop the capability to monitor and report on these criteria in a timely and credible manner.

The current NSCP-enhanced program will terminate March 31, 1993. The development and application of soil and water quality monitoring systems remains a priority A-base activity of the Centre for Land and Biological Resources Research.

Enhanced future funding for the program will come through the provincial implementation programs of the Green Plan. Thus, national activities, such as the development of simulation models of soil degradation processes, should occur through co-ordination of provincial activities. The provincial approach for the Green Plan will ensure local responsiveness, but without effective networking and collaboration, there is a real potential for duplication of effort and omission of important aspects. The expert committee is strongly encouraged to facilitate these essential collaborations across the country.

4.1 CONCERNS

With few exceptions, the increased emphasis and demand reported in 1990 on the use of soil survey information across Canada still remains high. This reflects increased activity in extension programs by the various soil survey units, a growing awareness by the public of environmental issues such as soil conservation and degradation problems and implementation of National programs such as the NSCP and the soil carbon data base file for global warming studies. Indeed, the province of British Columbia is recommending the reestablishment of a BC soil inventory program after having dropped it only a few short years ago.

The following areas of concern reflect many of the issues identified in the 1990 report to CCLRS, and as well, new areas identified in individual reports received from various units across Canada at the 1992 meetings.

1. NATIONAL/PROVINCIAL SOIL DATA BASE FILES

Maintenance of these files, in particular the national system, is becoming problematic due to lack of funding. For example, input of up to ten map sheets from B.C. have been stalled and there is a concern that these may be lost in the archiving process. A significant backlog of maps awaiting digitization already exist in Ottawa as a result of a shortage in manpower and/or funding.

2. AVAILABILITY OF ELECTRONIC DATA FILES

There was a general consensus that there is an urgent need to develop data release policies for electronic data files. The demand for digital data is increasing; yet its availability is often frustrated by lack of federal/provincial policies on data release. This is a long standing concern.

3. BACKLOG OF PUBLISHED REPORTS AND MAPS The availability of soil survey reports and maps, both in hard copy and electronic format, has become a major issue. In some instances, inventory programs that were completed up to 10 and 15 years ago are still not available to the public due to a shortage of manpower for editing manuscripts and/or funding for publication. There is an increased demand for the product, taxpayer monies have been expended to complete the programs, yet the reports and maps remain unavailable to the public.

4. SOIL CORRELATION AND STANDARDS

Soil inventories from across the country are often completed at different scales. For example, inventory programs in New Brunswick, Québec and Alberta are completed at 1:5,000, 1:50,000 and 1:100,000, respectively. As well, these programs may be undertaken by federal or provincial agencies or the private sector. Most of these surveys are also inputted into electronic data bases. This has placed increased pressures on the importance of soil correlation and the development of standards and specifications to ensure compatibility of data sets.

5. SUPPORT FOR SOIL INVENTORY PROGRAMS

Inadequate staffing to meet the demands placed on soil inventory programs remains a problem. This not only includes the staff required for field mapping programs, but as well, soil correlation, management of electronic data bases, delivery of maps and reports, interpretation of the information for alternative uses, technology transfer and training of qualified individuals.

4.2 RECOMMENDATIONS

4.2.1 BACKLOG OF PUBLISHED REPORTS AND MAPS

Due to the serious backlog of reports and maps awaiting publication, it is recommended that agencies responsible for soil inventory programs give high priority to allocation of funds and/or manpower to reduce this backlog and to undertake research into the development of optional procedures for the publication of maps and reports in the future.

BACKGROUND

There is an increased demand for soil inventory information across the country, both in hard copy and electronic format. Numerous soil inventory programs have been completed, yet they remain unavailable to the public due to manpower shortages and/or funding.

4.2.2 SOIL QUALITY EVALUATION PROGRAM

It is recommended that federal-provincial agencies continue to assign the Soil Quality Evaluation Program a high priority and encourage the securance of adequate long-term funding to complete the program in order to promote sustainable agriculture.

Background

A Soil Quality Evaluation Program has been developed by the CLBRR in collaboration with other government agencies and universities across Canada. This program has relied heavily on short-term funding from NSCP for initiation but the requirement for an effective and continuing response to land resource sustainability in agriculture is long-term. The strategy for the continuation of this promising program in the post-NSCP period is a concern recognized by the ECSS. Implementation of aspects of the SQEP could be accomplished by relating it to the Green Plan for Environmental Sustainability.

4.2.3 GLOBAL CHANGE

It is recommended that soil survey agencies be included in the many Canadian Global Change initiatives, and be encouraged to offer their expertise to international programs that require realistic, standardized small scale soil landscape data bases.

Background

A soil carbon data base has been compiled for all of Canada based on small scale soil landscape maps. This national coverage is indicative of the initiative and the expertise of the soil survey community in Canada. The computerized data base provides the information needed to assess present levels of carbon in Canadian soils. Additional attributes required by process-oriented models for estimating the extent of carbon and other attribute fluxes from soils as a result of environmental change are also included in this data base.

APPENDIX 1

Agenda

Expert Committee on Soil Survey Meeting

Ottawa, October 19-20, 1992 Neatby Building, Central Experimental Farm

Monday, October 19

8:30 - 9:00	Welcome, Dr. R. Asselin, Director, CLBRR
9:00 - 9:30	CASCC Action Taken and ECSS Accomplishments - 1991/92
9:30 - 10:00	Regional Reports:
9:30-9:40	Yukon
9:40-9:50	British Columbia
9:50-10:00	Alberta
10:00-10:10	Saskatchewan
10:10 - 10:30	Coffee
10:30 - 12:00	Regional reports and discussions
10:30-10:40	Manitoba
10:40-10:50	Ontario
10:50-11:00	Quebec
11:00-11:10	Atlantic Region
11:10-11:20	Indian and Northern Affairs
11:20-11:30	Energy, Mines & Resources
11:30-11:40	PFRA
11:40-11:50	Forestry
11:50-12:00	Inland Water Directorate
12:00 - 1:30	Lunch
1:30 - 3:00	ECSS Related Studies Reports
1:30-1:45	Overview of Land Resource Division, CLBRR - D. Coote
1:45-2:00	Soil correlation and standards - J. Shields
2:00-2:15	Soil taxonomy - C. Tarnocai
2:15-2:30	National soil inventory - J. Shields
2:30-2:45	Provincial/Territory soil inventory - D. Coote
2:45-3:00	CANSIS/National Soil databases - B. MacDonald
3:00 - 3:30	Coffee
3:30-3:45	Interpretive algorithms - W. Pettapiece
3:45-4:15	Soil quality evaluation - D. Acton
4:15-4:30	ECSS working group business
4:30-5:00	Discussions of issues/preliminary recommendations

Tuesday, October 20

8:00 - 10:00	Environmental Impacts on the Pedosphere - A New Focus - Discussion Leader - W. Pettapiece/E.E. Mackintosh
10:00 - 10:30	Coffee
10:30 - 11:15	Focus for the Future - priorities for next four years - continuation of soil quality evaluation - greenplan
11:15 - 12:00	Potential Funding Sources - CLBRR plans and support - R. Asselin - provincial accord priorities
12:00 - 1:30	Lunch
1:30 - 2:15	Marketing our Products - Are we serious?
2:15 - 3:00	Issues and Recommendations - CCLRS
3:00 - 3:30	Coffee
3:30 - 4:30	Issues and Recommendations
4:30	Adjourn

APPENDIX 2

Membership List for 1992 ECSS Meeting

MEMBERSHIP LIST OF EXPERT COMMITTEE FOR SOIL SURVEY

The current members, full addresses and termination dates are listed below:

	Regional Members	Term Ends
British Columbia	H.A. Luttmerding Province of B.C. Integrated Management Br. Ministry of Environment Lands and Parks 780 Blanshard Street Victoria, British Columbia V8V 1X5	1994
	Tel: (604) 387-9657 Fax: (604) 387-9750	
Alberta	S. Moran Alberta Research Council P.O. Box 8330, Station "F" Edmonton, Alberta T6H 5X2	1994
а.	Tel: (403) 438-7554 or 450-5251 Fax: (403) 461-2651	
Courier to:	S. Moran Alberta Research Council 250 Karl Clark Road Environmental Reserach & Engineering Dept Edmonton, Alberta T6H 5X2	
Saskatchewan	D. Anderson Head, Dept. of Soil Science Agricultural Building, Rm 5D34.1 University of Saskatchewan Saskatoon, Saskatchewan S7N 0W0	,
	Tel: (306) 966-6827 Fax: (306) 966-6881	
Manitoba	Bob Eilers Unit Head Canada - Manitoba Soil Survey Soil Science Bldg. University of Manitoba Winnipeg, Manitoba	1995
	Tel: (204) 474-6123 Fax: (204) 275-5817	

Ontario

Quebec

Nova Scotia P.E.I. Newfoundland New Brunswick

Chairman

Secretary

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APPENDIX 3

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Terms of Reference

TERMS OF REFERENCE

The Terms of Reference for the ECSS are as follows:

- 1. To advise the Canada Committee on Land Resource Services (CCLRS) and other agencies of the adequacy of soil survye and land evaluation services in providing for sustainable development of land resources for agriculture and other users.
- 2. To encourage the establishment of a national system of soil classification and land evaluation by structuring working groups to recommend and encourage reserach on soil classification systsems and operational procedures for use on a national basis.
- 3. To exchange invormation on major pedological activities, issues and concerns in members' respective jurisdictions.
- 4. To develop and recommend strategies and actions in response to land resource and enviornmental issues of national and regional importance.
- 5. To recommend to the CCLRs actions required for improved service in the resource areas of soil survey and land evaluation.
- 6. To carry out special tasks and studies and to perform other duties as may be required by CCLRS or other concerned agencies.

APPENDIX 4

Report of the ECSS to the Canada Committee on Land Resource Services (December, 1992) Report of the Expert Committee on Soil Survey to the Canada Committee on Land Resource Services (December, 1992).

EXECUTIVE SUMMARY

A meeting of the Expert Committee on Soil Survey was held in Ottawa on October 19 and 20, 1992. A detailed report containing progress reports from provincial/federal agencies, working groups and related study groups is being prepared for circulation to the membership.

A. SUMMARY OF ACTIVITIES

1. SOIL INVENTORY AND CORRELATION

Soil inventory programs remain active across the country albeit at a much reduced level due to lack of funding and manpower shortages. The scale of mapping varies regionally from detailed onfarm surveys to mapping at 1:100,000. This in turn generates a greater need for soil correlation and development of standards which is also limited by manpower.

2. GIS/CANSIS

Activities related to computerizing soil data bases continue to have a high priority across the country. Increased requests for the information have highlighted problems of data compatibility and transfer, as well as those relating to data ownership, citation and acknowledgement. These issues were also identified at the 1990 meetings and remain a problem due to manpower shortage and/or funding constaints.

3. NATIONAL SOIL CONSERVATION PROGRAM -SOIL QUALITY EVALUATION PROJECT

Considerable progress has been made in the development of systems for the prediction of wind and water erosion, and change to soil quality in organic matter status, soil structure and salinity. Much work remains to be done to identify soil quality indicators and to develop the capability to monitor these criteria. The NSCP program terminates in 1993. Future funding to complete the program will be sought through implementation programs of the Green Plan.

4. BACKLOG OF PUBLISHED REPORTS AND MAPS

The backlog in printing of reports and maps and upgrading of old inventories continues to be a major problem across the Country. There currently is a number of reports and maps awaiting publication in Ottawa (CLBRR) with a shortage of manpower and/or funding to complete the tasks.

5. SOIL WATER INVESTIGATION MANUAL (SWIM)

The SWIM working group has completed its activities with the publication of a SWIM Manual in 1992.

B. AREAS OF CONCERN

With few exceptions, the increased emphasis and demand reported in 1990 on the use of soil survey information across Canada still remains high. This reflects increased activity in extension programs by the various soil survey units, a growing awareness by the public of environmental issues such as soil conservation and degradation problems and implementation of National programs such as the NSCP and the soil carbon data base file for global warming studies. Indeed, the province of British Columbia is recommending the reestablishment of a BC soil inventory program after having dropped it only a few short years ago.

The following areas of concern reflect many of the issues identified in the 1990 report to CCLRS, and as well, new areas identified in individual reports received from various units across Canada at the 1992 meetings.

1. NATIONAL/PROVINCIAL SOIL DATA BASE FILES

Maintenance of these files, in particular the National system, is becoming problematic due to lack of funding. For example, input of up to ten map sheets from B.C. have been stalled and there is a concern that these may be lost in the archiving process. A significant backlog of maps awaiting digitization already exist in Ottawa as a result of a shortage in manpower and/or funding.

2. AVAILABILITY OF ELECTRONIC DATA FILES

There was a general consensus that there is an urgent need to develop data release policies for electronic data files. The demand for digital data is increasing; yet its availability is often frustrated by lack of federal/provincial policies on data release. This is a long standing concern.

3. BACKLOG OF PUBLISHED REPORTS AND MAPS

The availability of soil survey reports and maps, both in hard copy and electronic format, has become a major issue. In some instances, inventory programs that were completed up to 10 and 15 years ago are still not available to the public due to a shortage of manpower for editing manuscripts and/or funding for publication. There is an increased demand for the product, taxpayer monies have been expended to complete the programs, yet the reports and maps remain unavailable to the public.

4. SOIL CORRELATION AND STANDARDS

Soil inventories from across the country are often completed at different scales. For example, inventory programs in New Brunswick, Québec and Alberta are completed at 1:5,000, 1:50,000 and 1:100,000, respectively. As well, these programs may be undertaken by federal or provincial agencies or the private sector. Most of these surveys are also inputted into electronic data bases. This has placed increased pressures on the importance of soil correlation and the development of standards and specifications to ensure compatibility of data sets.

5. SUPPORT FOR SOIL INVENTORY PROGRAMS

Inadequate staffing to meet the demands placed on soil inventory programs remains a problem. This not only includes the staff required for field mapping programs, but as well, soil correlation, management of electronic data bases, delivery of maps and reports, interpretation of the information for alternative uses, technology transfer and training of qualified individuals.

C. RECOMMENDATIONS

The following recommendations were approved by the ECSS.

1. BACKLOG OF PUBLISHED REPORTS AND MAPS.

Due to the serious backlog of reports and maps awaiting publication, it is recommended that agencies responsible for soil inventory programs give high priority to allocation of funds and/or manpower to reduce this backlog and to undertake research into the development of optional procedures for the publication of maps and reports in the future.

BACKGROUND

There is an increased demand for soil inventory information across the country, both in hard copy and electronic format. Numerous soil inventory programs have been completed, yet they remain unavailable to the public due to manpower shortages and/or funding.

2. SOIL QUALITY EVALUATION PROGRAM

It is recommended that federal-provincial agencies continue to assign the Soil Quality Evaluation Program a high priority and encourage the securance of adequate long-term funding to complete the program in order to promote sustainable agriuciture.

BACKGROUND

A Soil Quality Evaluation Program has been developed by the CLBRR in collaboration with other government agencies and universities across Canada. This program has relied heavily on short-term funding form NSCP for initiation but the requirements for an effective and continuing response to land resource sustainability in agriuclture is long-term. The strategy for the continuation of this promising program in the post-NSCP period is a concern recognized by the ECSS. Implementation of aspects of the SQEP could be accomplished by relating it to the Green Plan for Environmental Sustainability.

3. GLOBAL CHANGE

It is recommended that soil survey agencies be included in the many Canadian Global Change initiatives, and be encouraged to offer their expertise to international programs that require realistic, standardized small scale soil landscape data bases.

BACKGROUND

A soil carbon data base has been compiled for all of Canada based on small scale soil landscape maps. This national coverage is indicative of the initiative and the expertise of the soil survey community in Canada. The computerized data base provides the information needed to asses present levels of carbon in Canadian soils. Additional attributes required by process-oriented models for estimating the extent of carbon and other attribute fluxes from soils as a result of environmental change are also included in this data base.

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APPENDIX 5

Acknowledgements

ACKNOWLEDGEMENTS

Ecological Services for Planning Ltd. - For reformatting and word processing of the Provincial, Agency, Working Group and related Study Reports

Linda Mitchell - Work processing cooperation

Dave Kroetsch and J. Brown - meeting room setup, coffee arrangements and photocopying.

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