Expert Committee
on Soil Survey

Proceedings of the Eighth Meeting

Winnipeg, Manitoba
14-16 November 1988

Canada

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Summary

The Expert Committee on Soil Survey (ECSS) met for 3 days under the chairmanship of Dr. E.E. Mackintosh. On day 1 it discussed the changing role of CASCC and some communication problems with the system were noted. This later led to a discussion of the terms of reference of ECSS. The ECSS also received reports on activities and concerns from the various provinces and regions of Canada. There were many common issues particularly regarding data base development, sharing and use. This reflects a growing involvement in electronic data management and was expressed in the form of recommendations to the Canada Committee on Land Resource Services (CCLRS). Another issue was the variable lack of commitment to inventory in some areas and the expressed need for LRRC to maintain a strong national focus. All of the Atlantic provinces have concentrated on on-farm surveys and extension support. Quebec reported on a major soil degradation study and BC reported the loss of a strong provincial inventory unit. The need to find an effective method of upgrading old surveys was expressed in nearly every report.

Day 2 was devoted to an exercise to provide guidance for planning future direction for the federal soil survey. It was a structured process which involved identification of tasks, evaluating criteria and priority setting. The ranking suggested that future emphasis should be placed on development of national and regional interpretive guidelines, monitoring and modelling changes in land quality, land evaluation, development of a national soils database and systematic survey of agricultural land. This provided valuable nation-wide input for federal planning.

Day 3 considered working group reports on Soil Classification, CanSIS, Soil Survey Handbook, Agricultural Interpretations, Soil Water Investigations, and Map and Formats group. Members were brought up to date and provided direction for future work. A list of recommendations and concerns were formulated for transmittal to CCLRS. An issue which received particular attention was the need for an "extension" component in soil survey. The need for a new "Terms of Reference" was discussed with a decision tabled until the 1990 meeting.

The meeting was closed by E. Mackintosh thanking all the participants for their active participation and urging a more proactive stance on the application and use of soil survey information.

Résumé

Le Comité d'experts de la prospection pédologique (CEPP a tenu un réunion de trois jours sous la présidence de M. E.E. MacKintosh. Le premier jour, le comité a discuté de l'évolution du rôle du CCSAC et signalé certains problèmes de communications avec le système, ce qui a donné lieu, plus tard, à un débat sur le mandat du CEPP. Le comité a également reçu des rapports décrivant les activités et les préoccupations des diverses provinces et régions du Canada. Plusieurs questions se recoupaient, notament l'établissement, le partage et l'utilisation de la base de données. La participation à la gestion électronique des données augmente sans cesse. Le comité a fait en ce sens des recommandations au Comité canadien des ressources du territoire (CCRT). La contribution inconstante et insuffisante à l'inventaire dans certaines régions et la necessité exprimée par la CCRT d'en fair une préoccupation nationale importante on retenu également l'attention des membres du comité. Toutes les provinces de l'Atlantique on mis l'accent sur les prospection à la ferme et le soutien à la vulgarisation. Le Québec a présenté une étude d'envergure sur la dégradation des sols et la Colombie-Britannique a tenu à signaler la perte d'un important service d'inventaire provincial. Presque tous les rapports ont fait état de la nécessité de trouver une méthode efficace pour améliorer les anciennes techniques de prospection.

Le deuxième jour a été consacré à un service de planification des futures orientations de la prospection pédologique fédérle. Il s'agissait d'un processus structuré comportant la détermination des tâches à accomplir l'évaluation des critères et l'établissement des priorités. Il en découle qu'on devrait mettre l'accent à l'avenir sur l'élaboration de lignes directrices d'interpretation à l'échelle nationale et régionale sur la surveillance et sur la modélisation des changements survenues dans la qualité des sols, sur l'évaluation des terres, su l'établissement d'une base de données pédologiques nationale et sur la prospection systématique des terres agricoles. Ce processus a permis d'assurer la contribution précieuse de toutes les régions du pays à la planification fédérale.

Le troisième jour, on examiné des rapports de groupes de travail sur la classification des sols, le Système canadien d'information sur les sols, le Manuel de prospection pédologique, les interprétations agricoles, les études sur l'eau du sol, la cartographie et la mise en forme. On a donné aux membres les renseignements les plus récents et on les a orientés quant à leur futur travail. On a dressé une liste de recommandations et la préoccupations à transmettre au CCRT. La nécessité d'introduire un élément de vulgarisation dans la prospection pédologique a reçu une attention particulière. On a discuté de la nécessité d'établir un nouveau mandat et on a reporté la décision jusqu'à la réunion de 1990.

M. E.E. MacKintosh a levé la séance en remerciant tous les participants pour le rôle actif qu'ils ont joué et en les priant instamment d'adopter une position plus proactive face à l'application et à l'utilisation des données de prospection pédologique.

PROVINCIAL REPORTS

EXPERT COMMITTEE ON SOIL SURVEY: 8TH MEETING

WINNIPEG, MANITOBA

14TH NOVEMBER 1988

BRITISH COLUMBIA REPORT TO ECSS, NOVEMBER 1988

H.A. Luttmerding

As reported at the last meeting of the Expert Committee, the provincial group with primary responsibility for soil survey and related functions was severely downsized in the mid-1980's. The majority of staff was transferred to Wildlife, Waste and other branches of the provincial government. A total of five individuals remained with the Soils Section.

During the past summer (July/88) these remaining five positions were also transferred - four went to Waste Management Branch and one to Wildlife Branch. Some priority projects have been carried by the staff until the projects are completed (i.e., Generalized Soil Landscapes of B.C.) and responsibility for soil correlation, quality control and the B.C. Soil Information System was also maintained. The consequence, however, is that the province no longer has a group whose main responsibility is soil inventory and interpretation.

In early 1988 the Ministry of Agriculture and Food's Soil, Feed and Tissue Testing Laboratory was privatized. This is the lab where soil survey samples were analyzed in the past. The employee purchased lab, as part of the privatization process, negotiated a guaranteed contract with both Agriculture and Food, and Environment for a period of three years to provide a specified level of service. In the short term, the arrangement seems to be working relatively well, but longer term concerns relating to ongoing funding, quality control, priorities, etc., are unresolved.

In spite of the rather gloomy introduction, some positive soil related progress has occurred in British Columbia.

A. Soil Survey and Related Interpretations

1. The detailed soil survey of the east coast of Vancouver Island, conducted by the provincial soils group, is complete except for the publication of the report covering the Parksville - Qualicum Beach - Courtenay - Alberni area. The report is written/edited and is at the graphics preparation stage.

   Completed and available are: (a) soil survey report of the Duncan area; (b) 1:20,000 scale soil maps, totaling 39 full or partial sheets; (c) soil capability for agriculture maps at the scale and covering the same areas as the soil maps; (d) interpretive maps of the same areas addressing potential soil erosion, agricultural soil management groups, septic tank effluent absorption, irrigation water requirements, soil drainage, and potential flooding - high water tables and; (e) interpretations for selected map sheets dealing with susceptibility to acidification, and residential settlement suitability.

   The base polygon/soil information for the east coast of Vancouver Island is stored in computer files.

2. Detailed soil surveys of the North Saanich and Highland areas near Victoria were also recently completed. These areas, mapped at

1:20,000 scale, were correlated with the east coast of Vancouver Island survey - separate reports were not prepared since most of the soils are described in the east coast reports. Interpretive products are similar to those prepared for the east coast survey and the base data also reside in computer files.

3. A resurvey of a portion of the North Okanagan area was completed about a year ago by consultants contracted by the Ministry of Environment. The study, consisting of lands draining into the north end of Okanagan Lake, was initiated to provide more precise data on soil - land use relationships and their impact on water quality in Okanagan Lake and tributaries.

   The consultant was asked to update existing 40 chain soil information dating from the early 1960's to 1:20,000 scale, complete with a required number of representative soil profile descriptions and samples. Resultant products include 1:20,000 scale soil maps with expanded legend (no report), updated soil capability for agriculture maps, and maps addressing potential soil erosion, septic tank effluent absorption capability and soil transmission of phosphorous from septic tank effluent.

4. The detailed survey of the Gulf Islands, a federal project, is essentially complete. Soil maps and reports (Volume 1, Saltspring Island; Volume 2, Pender, Prevost, Mayne and Saturna islands) are published; Volume 3, Galiano, Valdes, Thetis and Kuper islands, is scheduled for Spring 1989 printing; while Volume 4, Gabriola Island, and Volume 5, Sidney, James, Moresby and Portland islands, are in final edit stages.

5. The federal group is also cooperating with the Agassiz Research Station in producing a 1:5,000 scale soil map of a small watershed (350 ha) on Promontory Ridge near Chilliwack based on systematic grid sampling at 90 locations. Soil, land use and slope data collected at each sampling location will provide input into a soil and sedimentation model for predicting sediment production resulting from different urban development density scenarios.

6. Gradual progress is also being made on publication of several outstanding reconnaissance soil survey reports. Soils of Southern Vancouver Island (#44) was published in Spring 1988 (the color, 1:100,000 scale soil maps were produced by LRRC, Ottawa). The report for Bonaparte River - Canim Lake area (#24) with accompanying 1:100,000 scale soil maps has also been published. The report for the Jarvis Creek - Morkill River area (#41) was published in 1987 with 1:50,000 soil maps included as microfiche.

   The report for the Prince George - McLeod Lake area (#23) is progressing slowly. The text is complete and awaiting insertion of graphics. Interim diazo soil map prints are available. The report for the East Kootenay area (#20) is currently going through final edit and, after graphics are completed, should be published in 1989. Colored 1:100,000 scale maps prepared by LRRC are currently available. The report for the Ashcroft area (#26) is awaiting final edit - interim diazo soil maps are available.

7. Habitat mapping is ongoing in parts of British Columbia. This biophysical mapping generates soil, vegetation and terrain data specific to the requirements of the wildlife management program. Current projects include: (a) broad reconnaissance (1:250,000 scale) inventory in the N.W. corner of B.C. (NTS 104N and 104K). Field work is complete. (b) 1:50,000 to 1:100,000 scale inventories in Wells Gray, Purcell and Mt. Robson provincial parks have been completed. In addition to the base inventory maps, computer derived wildlife interpretive maps for forage enhancement, fire management, ungulate capability, grizzly bear habitat management and caribou habitat management have been produced; (c) detailed habitat inventory (1:10,000 to 1:20,000 scale) has also been undertaken in the Mt. Michael, Shorts Creek and Kalamalka Lake park areas.

8. The British Columbia Generalized Soil Landscapes project is progressing satisfactorily. In the summer of 1987 reconnaissance soils and related data were gathered in the Golden, Anaheim Lake - Bella Coola - Mid Coast, and Lillooet areas to enhance the existing database for the southern half of the province. Mapping and database compilation is currently ongoing in this area. During the 1988 summer, reconnaissance of various areas in the northern part of the province was carried out to improve the rather sparse database. Mapping and data compilation will begin as soon as the southern map is completed.

9. The CLI soil capability for agriculture maps in the Peace River area are currently being upgraded/revised by the federal soils staff, based on new or more detailed soil and climate information. Improved climate capability for agriculture maps necessitate most of the revisions.

10. Conversion of CanSIS to ARCINFO of various map areas in the province are underway, mainly by federal staff. Priority is the Peace River area, Nechako - Francois Lake map area and several map areas in the Cariboo. Preparation of soil name, soil layer and other files is essentially complete for the Peace River and Nechako - Francois Lake areas. The latter area was compiled by provincial staff, but further ongoing support for the project is unlikely (except for specific discussions/questions) due to transfer of staff to other responsibilities.

B. Other Major Soil Related Endeavors

1. The B.C. Ministry of Agriculture and Food is currently deriving interpretations from soil survey information which assess specific crop risk. The first assessment was completed in 1987 for strawberry suitability in the Lower Fraser Valley. With the assistance of the Soils Section, Ministry of Environment, key soil characteristics were evaluated for their suitability to support strawberry production and a matrix of soil suitability ratings was developed for both improved (drained and irrigated) and unimproved conditions. These suitability factors were then combined with other crop management and location factors to arrive at an overall strawberry suitability assessment. The system was developed for the Ministry's Crop Insurance Program to identify specific perils which affect the risk of crop loss.

Similar crop risk assessments are under development for blueberries in the Lower Fraser Valley and grain crops in the Peace River region. The grain risk assessment will be developed on a geographic information system with the assistance of LRRC, Vancouver.

2. Two procedure/classification manuals have been updated/revised by the Ministry of Environment. The first, "Decribing Ecosystems in the Field", describes field procedures and forms to be used for collecting biophysical field data including soils, site, terrain, vegetation, wildlife habitat and forest mensuration data. The second is the "Terrain Classification Manual" which provides the classification/mapping system for terrain (surficial geology) surveys in British Columbia. The original versions (published 1980 and 1976, respectively) are out of print - the revised versions are scheduled for Spring 1989 publication.

3. Several accomplishments of note have occurred in the realm of forest harvesting. Firstly, Coastal Fisheries - Forestry Guidelines are now in place and are the standard for all forest management activities involving the fishery/forestry interface. Inherent in the guidelines are requirements for information related to terrain stability, soil erodibility and the reaction of pesticides and fertilizers in soil. Secondly, the final approximation of the Watershed Workbook - Forest Hydrology Sensitivity Analysis for Coastal British Columbia Watersheds has been published for trial use during 1988 and 1989. Data requirements include levels of erosion, identification of unstable areas and an indication of the expected effects of forest development on erosion and slope stability.

   Pre-harvest silvicultural prescriptions are now a requirement of all Cutting Permit applications. This requires the generation of site specific soil and terrain data for each logging area.

4. A variety of studies relating forest management, site degradation and continued forest productivity are ongoing at UBC, BCMOF and CFS. Among these are studies evaluating impacts of harvesting systems and season on levels of soil disturbance and on soil physical and chemical properties, appropriate methods for measuring site disturbance, prescribed burning effects on tree nutrition and growth, including effects of sulphur and mineralizable nitrogen, and various landing rehabilitation studies.

5. A variety of agriculturally oriented soil degradation studies are also ongoing. LRRC, Vancouver, has applied the USLE to soil map polygons in the Peace River Region - the report is in publication. Sixteen erosion field plots in the Peace River area are undergoing monitoring with a view to evaluating the temporal and spatial variability of soil loss, and factors in the USLE that lead to either overprediction or underprediction of soil loss. Three tillage treatments (conventional, reduced and zero) are also being compared in the Peace River region to measure their effects on various hydrologic and physical soil parameters.

The effects of soil degradation on forage and corn production in the Matsqui Valley of the Lower Mainland is being studied by UBC. Included is the use of digitized color - IR aerial imagery for predicting quality and quantity. Various studies relating to organic matter degradation and soil erosion are also underway.

ALBERTA REPORT TO ECSS, NOVEMBER 1988

S. Moran

This report summarizes the land-related inventory activities in Alberta in 1987 and 1988 and the issues and concerns that arose during that time. The information presented is based on material obtained from the subcommittees of the Alberta Soils Advisory Committee, Alberta Institute of Pedology and departments of the Government of Alberta.

1. STATUS OF SOIL INVENTORY AND RELATED ACTIVITIES

1.1 Alberta Soil/Land Inventory Coordinating Committee (ASLICC)

This committee coordinates soil/land inventory activities in Alberta. It recently completed a report that identifies user needs and available information sources for the province. The report concluded that at least 72 distinct resource management programs within the province required the availability of soil/land information for decision making. Furthermore, the existence of at least eight major databases containing soil/land information collected with varying degrees of intensity, reliability, use-orientation and presentation at various scales were documented.

1.2 Current Soil Inventory Projects

1.2.1. Agriculture Canada and Alberta Research Council

1. Soil survey of the County of St. Paul. Initiated April 1987. Expected completion June 1990. Approximately 70% of fieldwork completed to date.

2. Soil survey of the Municipal District of Pincher Creek. Initiated 1985, interim report and maps produced in 1988, final report under revision.

3. Soil survey of the Municipal District of Cardston. Interim report and maps produced in 1986, final report under revision.

4. Soil survey of the Gleichen map sheet (S1/2-82I). Fieldwork initiated 1988. Approximately 25% of fieldwork completed to date.

Projects completed in 1987 and 1988.

1. Soil survey of the County of Flagstaff.

2. Soil survey of the Calgary Urban Perimeter.

3. Soil survey of the County of Paintearth.

4. Soil survey of the County of Beaver.

5. Reconnaissance Soil Survey of the Oyen Map Sheet (reprinted).

6. Soil survey of the County of Warner.

1.2.2 Alberta Agriculture - Land Evaluation and Reclamation Branch.

This group conducted SIL II and SIL III inventories for land classification for irrigation (southern Alberta).

1.2.3 Forestry, Lands and Wildlife - Public Lands Division

This group conducted arable land inventory for potential agricultural expansion in northern Alberta.

1.2.4 Forestry, Lands and Wildlife - Land Information Systems Division

This group conducted a number of biophysical land inventories throughout the province. Details are provided.

Type of Survey	Location	Requesting Agency
Lakeshore Biophysical	Lawrence, Smoke, Iosegun, Christina, Touchwood Lakes	Forest Land Use Branch
Biophysical	North Ram/Nice Creek Natural Areas	Forest Land Use Branch
Physical Land Classification	Blainmore District	Forest Land Use Branch
Erosion Hazard Rating	Clearwater/Rocky Forest	Forest Land Use Branch
Soil and Vegetation Data	Permanent Sample Plots	Forest Measurement Branch
Physical Land Classification	Grazing Leases-Southern AB	Public Lands
Site Suitability for Agriculture	Keg River-Arable Land Survey	Public Lands
Sensitivity Assessment	Bonnie Lake Shoreline	Fish and Wildlife

1.3 Published Reports and Maps

1. Alberta Soils Advisory Committee (1986): Land capability classification for arable agriculture in Alberta. A working document; Alberta Agriculture, Edmonton, pp. 89 . (mimeo)

2. Greenlee, G.M. (1988): Soil survey of Vermilion Provincial Park study area and interpretation for recreational use. Alberta Institute of Pedology, Report no. M-83-7; Terrain Sciences Department, Alberta Research Council, Edmonton, pp. 48.

3. Greenlee, G.M. (1988): Soil survey of Saskatoon Island Provincial Park and interpretation for recreational use. Earth Sciences Report 88-1; Terrain Sciences Department, Alberta Research Council, Edmonton, pp. 16.

4. Hiley, J.C., G.T. Patterson, G.K. Peterson, W.W. Pettapiece, and R.L. Werhahn (1986): SIDMAP: Soil inventory data base for management and planning: development application and evaluation. Alberta Institute of Pedology, Report no. M-86-1; University of Alberta, Edmonton, pp. 22.

5. Holowaychuk, N. and R.J. Fessenden (1987): Soil sensitivity to acid deposition. Earth Sciences Report 87-1; Terrain Sciences Department, Alberta Research Council, Edmonton, pp. 38.

6. Howitt, R.W. (1988): Soil survey of the County of Beaver, Alberta. Alberta Soil Survey Report no. 47: Terrain Sciences Department, Alberta Research Council, Edmonton, pp. 58.

7. Kjearsgaard, A.A., J. Tajek, W.W. Pettapiece, and R.L. McNiel (1986): Soil survey of the County of Warner. Alberta Institute of Pedology Report no. S-84-46; Research Branch, Agriculture Canada, Edmonton, pp. 108.

8. Kjearsgaard, A.A. (1986): Reconnaissance Soil Survey of the Oyen Map Sheet-72M. Alberta Institute of Pedology, Report no. S-76-36; Research Branch, Agriculture Canada, Edmonton, pp. 49. (reprinted)

9. MacMillan, R.A., W.L. Nikiforuk, and A.T. Rodvang (1988): Soil survey of the County of Flagstaff, Alberta. Alberta Soil Survey Report no. 51; Research Branch, Agriculture Canada and Terrain Sciences Department, Alberta Research Council, Edmonton, pp. 88.

10. MacMillan, R.A. (1987): Soil survey of the Calgary Urban Perimeter. Alberta Soil Survey Report no. 45; Terrain Sciences Department, Alberta Research Council, Edmonton, pp. 244.

11. MacMillan, R.A., W.L. Nikiforuk, R.M. Krzanowski, and T.S. Balakrishna (1987): Soil survey of the Lacombe research station 1986 expansion area, v. 1 - report, and v. 2 - appendices. Terrain Sciences Department, Alberta Research Council, Edmonton.

12. Macyk, T.M. and A.H. MacLean (1987): Soil survey of the Plains Hydrology and Reclamation Project - Battle River project area. Alberta Land Conservation and Reclamation Council Report #RRTAC 87-10, Edmonton, pp. 62.

13. Pettapiece, W.W. (1986): Physiographic subdivisions of Alberta (map). Land Resource Research Centre, Research Branch, Agriculture Canada, Ottawa.

14. Terrain Sciences Department, Alberta Research Council (Interim Report, 1988): A Comparison of land information user needs and available information sources (prepared for the Alberta Soil and Land Inventory Coordinating Committee). Terrain Sciences Department, Alberta Research Council, Edmonton.

15. Turchenek, L.W. and M.E. Pigot (1988): Peatland distribution in Alberta (map). Terrain Sciences Department, Alberta Research Council.

16. Wells, R.E. and W.L. Nikiforuk (1988): Soil survey of the County of Paintearth, Alberta. Alberta Soil Survey Report no. 49; Terrain Sciences Department, Alberta Research Council, Edmonton, pp. 54.

1.4 GIS Activities

1.4.1 County of Flagstaff

The soil survey maps of the County of Flagstaff were digitized and are in electronic form. The maps were digitized used GEOBASE-STRINGS software. Future survey maps will be digitized using ARC-INFO software.

2. ISSUES AND CONCERNS

The global issues or concerns associated with inventory activities relate to: 1) the development of a strategy for an integrated soil inventory program in the province; and 2) the need for significant action into coordination of land information for a provincial soils database.

2.1 Soil Inventory Program

The Soil Inventory Subcommittee submitted the following resolution to the Alberta Soils Advisory Committee to highlight the concern regarding a reduction in soil survey activities in the province in recent years.

Whereas:

The soil survey program in Alberta has been reduced to the level where Agriculture Canada has only three pedologists working in the field and Alberta Research Council has one;

there is limited opportunity for students to gain experience in the science of soil inventory;

this is in far contrast to the level of 15 pedologists and 10 summer students during the 1970s;

the soil inventory data in Alberta is incomplete and largely outdated at a time when there is increased pressure for farmers, ranchers and land owners to incorporate appropriate measures for soil and water conservation;

an updated and expanded soil inventory program would enhance the development and implementation of federal, provincial and municipal conservation programs.

Be it resolved Alberta Agriculture "lobby" for federal-provincial funding to be allocated to support a viable soil survey program for the Province of Alberta.

While the limited progress in inventory work exists, Alberta Agriculture has a general concern or interest in maximizing the use of existing soil survey information. They are interested in the development of new or more innovative ways to adapt existing information, i.e. for use in defining "agronomic management units" and addressing the "maximum economic yield concept".

2.2 Provincial Soils Data Base

The Alberta Soils Advisory Committee submitted the following recommendation to the Alberta Agricultural Advisory Committee to highlight the concern regarding the need for coordination of land information.

Whereas:

soil and land information is being collected as a component of many individual agencies' land evaluation mandate;

the information is being isolated and possibly lost from further use by being resident with collecting departments or agencies;

other departments and agencies as well as the private sector could benefit from including components of the data collected in their own resource assessments and land evaluations;

the resource management community have been frustrated because the information is in an incompatible form;

Personnel with Agriculture Canada, Alberta Forestry, Lands and Wildlife, Alberta Municipal Affairs, Alberta Research Council, and Alberta Agriculture have identified the need to make their soil and land information available and accessible to a wide audience of resource managers;

it is desirable to have a high level of compatibility of data and data structures among natural resource bases, particularly within the public sector.

Therefore be it resolved Alberta Agriculture raise with the other land management departments the need for significant action in the coordination of land information in order to develop procedures for a provincial soils database suitable for public and private users. This would be the first step in the development of a detailed automated provincial soils database for use in resource management and conservation decisions.

To address the concern, at least in part, the Soil Series Working Group of the Soil Inventory Subcommittee has developed a plan for developing a soil series database. Soil series are the building blocks of soil map units and are the common element betwen maps of differing vintage presented at different scales or undertaken at different Survey

Intensity Levels. This makes soil series a logical focus around which soil attributes necessary for the Alberta Soils Data Base should be organized. Although a mechanism to address the problem has been developed, manpower resources will need to be identified to undertake the task.

SASKATCHEWAN REPORT TO ECSS, NOVEMBER 1988

D.W. Anderson

INVENTORY

Soil survey personnel at the Saskatchewan Institute of Pedology are involved currently with an active soil survey program that has been funded by Agriculture Canada, federal and provincial funds through the Economic and Regional Development Agreement (ERDA), and Agriculture Development Funds from Saskatchewan Agriculture. The main objective of the program is to assemble a soil inventory that will be of real value for management decisions in agriculture, with emphasis on soil conservation planning. The Saskatchewan Soil Survey mapped 1.28 million hectares in 1988, with survey projects in southwestern and east-central Saskatchewan, in 16 rural municipalities (RM). H.B. Stonehouse, assisted by L.M. Kozak, is in charge of the eastern project; H.P.W. Rostad, assisted by A.J. Anderson and W.D. Eilers, lead the western project. Surveyors included M. Bock, M. Samadi, R. Stushnoff, C.T. Stushnoff, L.G. Fuller and D. Cerkowniak, in the eastern project; with B.L. McCann, M. Boehm, G. Verity, D. Zink, C. Hilliard, P. Brand, T. Nerbas, H. de Gooijer, P. Krug and A. Woloschuk in the west. Approximately 200 transects (systematically sampled at about 12 points per transect) were done to determine the proportion and nature of soil series in mapping units. Preliminary reports that include an expanded legend and soil map (manuscript copy) will be prepared and available by May, 1989; final reports in a large format with soil and interpretive maps will be prepared as soon as practicable.

The soil survey is developing a computerized method of delivering soil survey information for each RM. The soils and interpretive information for each RM is stored on a single floppy disc that is easily accessible by any computer that is compatible with an IBM PC. Saskatchewan Agriculture and PFRA field staff will utilize this system for on-farm planning for soil conservation. Data may be accessed by entering legal location in the computer. H. de Gooijer has been instrumental to the success of this project.

Work progressed on the compilation of the Soil Names, Map Unit and Soil Layer files for Saskatchewan data going to CanSIS under the ARC/Info program. There is a continuing effort to expand the use of microcomputers in soil survey, both in the office and in the field.

Work is progressing on developing additional interpretations for the RM series of reports. Rating map polygons as waterfowl habitat is based on the number, size and degree of salinity of the dominant wetlands. A pilot project in the Humboldt area that involves R. Stushnoff is testing the feasibility of combining soil and wetland inventories. This information should be useful in wildlife management efforts, such as the North American Waterfowl Management Plan. Grazing capability is required for surveys in southwestern Saskatchewan where ranching is the main land use. The survey is co-operating with the Lands Branch (Saskatchewan Agriculture) to develop a rating based on soil and climatic information.

SOIL QUALITY, EROSION AND CONSERVATION

There are several projects that involve survey personnel, often in co-operation with other scientists of the S.I.P.:

a) Quantitative Wind Erosion Estimates - Work is continuing that determines the frequency and amount of wind erosion by using dust traps located in areas with different soils and land uses. A related study measures changes in the wind-erodible fraction of clay soils over winter. C. Hilliard leads this project.

b) Co-operative work led by E. de Jong and D.F. Acton is evaluating erosion on a landscape basis, with the long-term objective of rating erosion susceptibility based on topography (landform, surface curvature and slope), soil type and climate.

c) A detailed geostatistical evaluation of two otherwise similar cultivated and native transects with Weyburn Association soils on a hummocky morainal landscape has been completed, as the Ph.D. thesis of Alan Moulin. Another project, Garth Verity's M.Sc. thesis project, evaluated the cumulative effects of cultivation and erosion on declining soil quality of eroded knolls, and estimated yield reduction due to topsoil losses.

d) Evaluation of continuous cropping and wheat-fallow rotation on clayey Brown soils (Sceptre Association) was done by sampling a 15-point transect in each field, and measuring several soil properties related to organic matter, as well as 137Cs to estimate erosion.

e) Survey personnel, particularly W.D. Eilers, continue work to determine the geohydrological conditions that contribute to soil salinity. Geological work is done by the Saskatchewan Research Council on a contract basis.

f) Most soil survey personnel have been involved in a project to measure and map the organic matter content of Saskatchewan soils. Approximately one typical field is sampled for each 10,000 hectares, based on soil map units, with samples obtained from upper, mid- and lower slopes. About 3000 samples were taken in 1988. The variability of pH in different landscapes and on different materials is being assessed on many of the samples obtained in this study.

g) A PFRA-funded project to evaluate the improvement of Solonetzic soils by deep-plowing is led by M. Boehm, with experiments in the Weyburn and Kerrobert areas. Drought obliterated any significant yield results in 1988, but soil monitoring continued. M. Boehm presented a poster based on our findings to the International Symposium on Semi-Arid Agriculture in Amarillo, Texas in August. D.W. Anderson and M.C.J. Grevers were contributors to the presentation. A related laboratory study has examined the basic chemical reactions and processes that occur in soil columns containing mixes of A, B and C horizons with varying levels of gypsum and calcium carbonate. The latter is M. Leul's M.Sc. project.

h) D.F. Acton worked with the National Soil Conservation Project for much of 1988, organizing workshops and preparing a proposal to enhance research in soil quality monitoring and conservation. D.W. Anderson presented an invited paper on long-term ecological research, particularly long-term soil studies, to an international workshop in Berchtesgaden, F.R.G. in September 1988 and he has been invited to participate in a workshop

examining scaling problems in global change studies at the Canadian Institute for Advanced Research in Toronto.

i) G.A. Padbury, with assistance from many others, continued projects to complete the Agro-ecoregion Map that is a vital part of the Prairie Region Land Evaluation Project, and to complete the 1:1 M soil landscape databases. Work continued in the preparation of a relational database for previously surveyed (post-1958) area (scale 1:125,000). Attribute files containing basic soil characteristics have been prepared for some maps, with work continuing. This project will eventually include nine map areas and about 12 M hectares of agricultural land. Participants in this work include C.T. Stushnoff, R.E. White, H.B. Stonehouse, H. Rostad, A.J. Anderson, H. de Gooijer and S. Johnson.

j) The Institute considers that both use of soil inventory data and long-term monitoring should be based on geographical information system (GIS) or spatial models, and simulation models of process that use variables from the GIS. This development of both systems has some priority, with some progress on both problems in recent years, but a great distance to cover in order to make such systems operative in a practical sense. We consider that it is important that models work at different scales - both for detailed planning and regional, long-term assessments.

PEDOLOGICAL STUDIES

Projects, mainly graduate student research problems, have included:

a) Soil development in sandy, forest soils - This project examines the characteristics of soils with clayey bands at 1 to 1.5 M, carbonate nodules in deep subsoils, and prominent mottling to determine the relative effects of leaching and water tables on soil development. This is the M.Sc. project for M. Samadi.

b) The effect of physiographic position on soil changes resulting from forest invasion of grassland. We have observed that forest invasion of grasslands in uplands with eluvial leaching regimes results in a change from Black to Gray Luvisol soils over short distances at the forest-grassland boundary, whereas many lowland soils have thick Black soils under mature forest. Leslie Fuller is comparing two sites where these differences are evident, concentrating on both soil nutrients and process.

c) Pedogenesis, nutrient cycling and water flows in boreal landscapes with Luvisol and Organic soils - this work includes cooperation, mainly by D.W. Anderson, with other Institute scientists (Bettany, Stewart and St. Arnaud) to better understand the effects of pedogenesis on nutrient dynamics, and the role of Organic soils as sinks for nutrients lost from uplands, and the emission of methane and sulphur from wetlands. We think that such research be based on good knowledge of the soils in the region, and consider our contribution in this regard to be significant.

c) Clayey Soils - Work is continuing, primarily involving A.R. Mermut and D.F. Acton, to determine the properties, genetic processes and most

appropriate classification of the grumic clay soils of Saskatchewan. Most work in 1988 involved the sampling and characterization of three sites that will be examined by a group of international scientists in August, 1989 as part of a U.S.D.A. initiative to improve the classification of cold, clayey soils.

SOIL SURVEY AWARENESS AND EDUCATION

The Soil Survey has made a renewed effort to make other professionals, potential users and the general public aware of the soil survey and its various uses. G.A. Padbury and H.B. Stonehouse participated in familiarization tours, with personnel from the Saskatchewan Assessment Management Agency, in areas with recent soil survey maps. Harold Rostad, A. Woloschuk and H. de Gooijer prepared a display that describes soil survey, particpated in several field days and agriculture meetings, and attended the A.I.C./C.S.S.S. conference in Calgary. Authors of newly released R.M reports participated in extension meetings to introduce the report to farmers in the RM.

MANITOBA REPORT TO ECSS, NOVEMBER 1988

G.F. Mills

This report includes a brief summary of progress by the Canada-Manitoba Soil Survey during the current year and highlights concerns regarding support for soil inventory, land resource research and development activity.

1. PROGRESS REPORT

1.1 Soil Inventory

Resurvey of approximately 211 sq. miles at 1:20,000 scale and 171 sq. miles at 1:50,000 scale was completed during the 1988 field season. Initial reconnaissance survey was completed in the Duck Mountain Forest Reserve (approximately 50 sq. miles covered in 1988 with 1400 sq. miles completed in 1986 and 1987). Soil sampling and soil characterization studies were completed in the Swan River and Duck Mountain areas. These inventories met requests from the provincial Departments of Agriculture, Municipal Affairs and Natural Resources and will generally coincide with continuing requirements for base line soil data by PFRA. Reports and maps were published for 2 soil survey projects (D60 covering 5 contiguous rural municipalities and D74 R.M. of South Norfolk) and were completed to publication stage for 3 additional areas.

The soil survey organization in Manitoba continues to receive annual requests for inventory that exceed by 3- to 4-fold our existing capability to deliver service. These requests are priorized each year to accomodate the average 500 square mile per year rate of survey achieved by the inventory group. Provincial priority for soil survey information continues to be resurveys at 1:20,000 and 1:50,000 scales.

1.2 Soil Database for Manitoba

Work on the development of database formats suitable for more efficient evaluation, dissemination and utilization of soil data in Manitoba is progressing on several fronts. Emphasis is on projects defined by the Manitoba-LRRC 1988-89 project plans:

1. Generalized Soil Landscape Map - phase 2 legend
2. Development of ARC/INFO relational database for:
   a) all current inventory projects and selected published map areas
   b) Prairie Regional Land Evaluation project
   c) soil degradation studies

In addition, substantial progress has been made toward developing a Soil Information Management System for Manitoba (SIMS) with contract funding through an ERDA Agri-Food project.

Leadership is generally provided by Federal staff, with implementation relying on professional expertise from the province as required, and dedicated technical assistance from both Federal and Provincial units.

2. PROVINCIAL CONCERNS

Manitoba concerns relate to three aspects of the soil survey program - soil inventory, optimum utilization of soil survey data and land evaluation research. Two of these concerns have been articulated in the 1988 recommendation to the Soil Science Lead Committee of the Manitoba Agricultural Services Coordinating Committee (MASCC). As these concerns were given top priority by the Lead Committee and will be brought forward as recommendations to MASCC, they are also presented as priority concerns by Manitoba to the ECSS for 1988.

2.1 Soil Inventory Concerns

Demands made of soil survey resources in Manitoba annually exceed the capability to deliver service. In recent years, we have also experienced reduction in our inventory capability. Considering the high provincial priority for an ongoing resurvey program, Manitoba encourages the Land Resource Research Centre to continue support to the inventory through activities such as cartographic and data processing services, assistance in correlation activities and active involvement in the mapping program. Capability for field inventory can be significantly increased by the addition of 3 Federal EG-ESS level positions and 6 soil survey assistants. The provision of these positions would recognize the priority placed on soil inventory by the Province and enable more efficient, cost effective use of existing pedology staff with LRRC.

2.2. Optimizing Use of the Soil Survey Database

Manitoba continues to work toward more quantitative land evaluation. Soil survey is developing database and data handling systems (concern 2.5) designed to provide a more efficient and timely use of soil data for land evaluation research, planning and management (concern 2.6). A major limitation to the province-wide use of soil data to provide more quantitative land evaluation is that much of the existing soil map and characterization data is broadly based and dated in comparison to current resurvey information. Programs and support services provided to agriculture through agencies such as the Manitoba Crop Insurance Corporation, the Provincial Soil Testing Laboratory, Manitoba Agriculture Soils and Crops Branch, Municipal Affairs Planning and Assessment Branches, the Prairie Farm Rehabilitation Authority and the proposed National Soil Conservation Program all depend on rapid access to reliable standardized soil data capable of supporting up-to-date land evaluation and assessment.

The Province is dealing in part with this concern through an ongoing program of resurvey in greater detail of those land areas with extreme soil variability or land areas with the potential or pressure for intensive land use. This resurvey program concentrated in Agro-Manitoba is expected to take some 20 to 25 years to complete at present rates of progress. For this reason there is interest among some soil survey clientel to examine the potential for upgrading existing soil survey information for Manitoba, focussing on seven dated, soil association based soil maps that provide the only source of information for two-thirds of the cultivated acreage in southern Manitoba.

A non R and D recommendation to MASCC proposes to undertake the upgrade of existing soil survey information available for Manitoba. The upgrade program will overcome some of the limitations of these older, broadly based surveys. Information from the upgrade project, when incorporated into the soil geographical information system for the province will enable optimal use of all existing soil data for land evaluation and management throughout Agro-Manitoba. The techniques and procedures required to update and upgrade existing soil information should be developed and evaluated to ensure completion within a more meaningful time frame than is possible by standard resurvey. A 3-year program could accomplish the standardization to adopted GIS standards of existing published and unpublished survey information for Agro-Manitoba if present soil survey resources are augmented by technical PY support.

2.3 Extension of Soil Survey Information

This concern recognizes that land planning and management decisions often are made without benefit of the best available soil resource information. This under-utilization of soil survey data results in part from inadequate public relations and lack of user awareness about the nature and availability of soil survey data. Other contributing factors include the need for more vigorous marketing of existing products, the need for more interactive contact with clientel and the lack of a standardized consistent product.

Modest increases in extension activity are planned with existing soil survey resources. At the local level, soil survey personnel are prepared to work with user groups, dealing specifically with the use of soil maps and reports and interpretation of soil data. In addition, progress achieved in the Upgrade of Soil Survey Mapping project and GIS development is expected to greatly assist in extending the soil survey program and helping user clientel to make greater and more timely use of available soil resource data.

2.4 Soil Correlation Activities

Local correlation and quality control procedures are in place on a project basis and can be maintained by existing staff. However, provincial correlation requires increased attention in response to requirements for the developing soil resource database according to ARC/INFO standards (concern 2.5). In addition, any progress achieved on the upgrade of dated soil surveys will depend on increased provincial correlation (concern 2.2).

2.5 Soil Resource Geographic Information System (GIS) Development

Efforts in this area have recently been accelerated through adjustment to LRRC Manitoba Unit workplans and supplementary ERDA Agri-Food funding. Continuation of this support is essential until the GIS is fully developed and operational. The additional support required for the soil survey upgrade (concern 2.2) would be shared with the overhead costs of developing and loading the GIS to an operational level. The priority to develop "in house" GIS capability would be followed by the establishment of working relationships with other user agency GIS's. Delivery of information and service to the cient through the soil GIS is planned in both "batch" and interactive mode and will require cooperation of pedology staff and the dedication of 1 technical PY annually.

2.6 Research on Land Evaluation, Soil Degradation and Soil Productivity Modelling

Commitment to a National Agricultural Strategy in 1986 included increased and coordinated federal and provincial efforts in soil and water research, and technology development and transfer. A Manitoba concern related to such effort is needed for a program designed to understand the nature of land degradation and to model its impact on soil productivity. A cooperative program of soil quality research and land evaluation is required involving research expertise available at the University of Manitoba, the Land Resource Research Center (LRRC), the Canada-Manitoba Soil Survey and the Brandon Research Station. Implementation of such a program is beyond the current capability of available research resources in Manitoba.

It was proposed that the LRRC take the lead in developing an implementation strategy to establish a cooperative land evaluation research project focussing on soil quality, soil degradation and soil productivity. LRRC commitment to land evaluation, currently focussed on the status of soil quality and productivity, should be broadened to include research directed towards understanding the processes of degradation and to predict through simulation techniques the long term effects of changing management practice, changing weather patterns and land use on soil productivity. This program of cooperative research is required to accomodate both the short term objectives of the National Soil Conservation Program (NSCP) and long term requirements of the Province. This concern has been supported by the Soil Science Lead Committee and has been forwarded as a priority recommendation for consideration by MASCC.

2.7 Role of the LRRC Inventory Section

Federal contribution to the soil survey program in Manitoba has traditionally been directed to inventory activities. A recent shift in emphasis in federal work plans has altered the traditional role for the federal soil survey unit in the province. In spite of this changing role the province sees a need to maintain more overlapping programs between the federal and provincial components of the Manitoba Soil Survey. There are efficiencies in current cooperative arrangements and they should be maintained.

Manitoba continues to emphasize the need to maintain present activity in soil inventory. The additional technical resources proposed in our Soil Inventory Concerns (2.1) would increase the efficiency of the federal unit in Manitoba enabling greater participation in the soil inventory program.

To the extent that such a cooperative role with the provincial unit cannot be completely realized, there remain several other important areas for federal involvement in Manitoba. It is expected that soil mapping projects could benefit from federal input to soil correlation and study of pedon characteristics and spatial map unit variability and reliability. Database management and GIS development serve as an important focus for federal staff. The federal unit is expected to take a lead role in the proposed upgrade of older, dated soil mapping projects. The federal unit should assume responsibility for inputting to cooperative research with other specialists on land evaluation, soil degradation and soil productivity. Concerns related to taxonomy, quality control and the improvement of soil survey procedures can be shared with the provincial unit. Increased extension activity could also

benefit from participation of federal expertise. It is emphasized, however, that federal activity in any or all of these areas is of greatest value to the Manitoba inventory program when carried out as part of current mapping projects.

Manitoba encourages the LRRC inventory section to continue their activities in the province. The present organization of the inventory section with the LRRC research section should be maintained in order to ensure that specialized research expertise be available for all cooperative studies when required.

2.8 Soil and Water Research and Development Funding

In 1986 the National Agricultural Strategy reaffirmed an increased, coordinated federal and provincial commitment to soil and water research, and technology development and transfer. A major federal research role was confirmed. This commitment has been partially recognized in the Agri-Food Agreement projects currently in place.

Approximately 40 percent of the current soil and water R and D activity in the Province is supported by non A-base budget from programs contained in the Agri-Food Agreement which terminates in 1989-90. To date, negotiation in the development of Federal-Provincial soil and water accords under the proposed National Soil Conservation Program have placed minimal emphasis on soil and water research. Reliance on such short-term funding prohibits development of the continuing research activity required to achieve real progress in solving the land degradation and soil productivity assessment concerns unique to Manitoba's agriculture. Long term A-base funding, at least at an equivalent level to that of current Agri-Food support, is required to ensure continuation of essential R and D activity.

ONTARIO REPORT TO ECSS, NOVEMBER 1988

B. van den Broek

Introduction

Since the last time the Expert Committee on Soil Survey met, the Institute has steadily progressed with its five year program (to be completed by the early 1990's). It is anticipated that, on completion of the current five year program, only one major inventory will remain in the central part of the province. The next five year program will then see a shift in emphasis for the provincial pedologists. The proposal is to give each of them a regional responsibility with the objective of providing soils expertise to the current extension staff in the various counties. As far as the inventory program is concerned, more emphasis will then be put on upgrading the existing soil survey information rather than conducting full scale inventories.

The Land Stewardship as well as the SWEEP program have boosted the demand for reliable soil survey information. The emphasis in both programs is on good soil management and it is here that the soil information plays a significant role. Without the proper soils information, it is very difficult for the Soil Conservation Specialist to conduct an effective program in soil management. The detailed mapping projects for the paired watersheds for SWEEP can be considered as good pilot projects for developing the soil management concepts required for the rest of the province.

There is also a need for agronomic interpretations that will allow the pedologists to make soil management interpretations based on the available soil survey information. In the Tillage-2000 program about 40 bench mark soils have been established (similar to the "Farm-Lab." program in Saskatchewan). It is hoped that in the next two years, information can be used to develop these ratings.

Changes in personnel

Over the past two years, there were some significant changes in the staffing of the Ontario Institute of Pedology.

The most significant impact on our current five year program was the reassignment of Dr. Cliff Acton to the National Soil Conservation Program, and appointing Ted Presant to Acting Unit Head of the Agriculture Canada Soil Survey Unit. Before their reassignment, both staff members were actively involved in two of our current inventory programs (Brant and Niagara county), and their new responsibilities have resulted in delays in the completion of these projects. We hope that in the near future both these staff members will be provided with an opportunity to return to their original positions to complete these projects.

In the spring of this year, Keith Jones left the Institute to take up a position with the Alberta Research Council in Edmonton. Although the departure of Keith Jones was felt as a loss to the Institute (and particularly the forestry community in Ontario), the Institute was still

able to maintain the momentum in our computer operations, for a great part due to the efforts of Cheryl Fitzgibbon, Computer Data Manager for the Institute. Brenda Grant was hired to continue the work that was started by Keith Jones involving the completion of the CanSIS Attribute Files.

Agriculture Canada was fortunate to be able to hire Ken Denholm to fill Keith Jones' position on a short term contract basis. What is even more encouraging is the fact that 40% of Ken Denholm's time will be spent in the province's inventory program. This is a welcome addition to our overall inventory program.

There were no changes in the provincial staff nor the University staff, despite some severe budget restraints for the provincial soil survey unit. In the near future it can be anticipated that there will be some changes in the assigned duties of the provincial staff. It is proposed that the provincial staff will be assigned regional duties in support of our Land Stewardship program. The idea is to create regional expertise in the field of soil survey that can be of use to the delivery of our program.

Securing summer assistants for our inventory program has become some sort of a challenge too. Over the past few years we had to rely on a special job-creation program initiated by the Immigration and Employment Canada office. It is not sure how long we can rely on this program, and once it is cut off it will be even more difficult to find summer assistance due to a lack of funds.

Progress in inventory program

The Institute is now about half-way into our five year program. The main goal for this five year program was to complete the resurvey of counties with soils information dating back some forty to fifty years (at a scale of 1:126,720). At this moment, three soil surveys are nearing completion, that is, the final maps are being drafted and the soil reports being written. One project is nearing completion as far as the inventory phase is concerned, and one project is starting (legend building phase).

In our inventory program we have settled on a mapping scale of 1:50,000 and this seems to speed up the inventory phase. Map finalization and report writing is still a major problem as far as time is concerned. We decided on a reduced format (reduced from the Haldimand-Norfolk format) for the soil survey report and we are still debating further cut backs as far as the content is concerned. Recent developments in the CanSIS report format and map presentation are encouraging and it is hoped that in the near future this format can become standard for the Ontario reports. Also the introduction of microcomputers for the pedologists is a major step forward in report writing (time saving).

As far as the map reprinting is concerned, we seem to be on par now. Questions are being raised about the reprinting of the out-of-print soil survey reports. Many of these reports date back about 30 or 40 years, and some of the information in the reports is out of date. The

question is how we should proceed with re-introducing the information on the market.

Soil survey map sizes

As of late our soil survey maps seem to increase in size all the time. Our clients tell us that, for the sake of convenience, they want smaller maps. We realize that the Cartographic Unit of the LRRC has a limited budget as far as map printing is concerned. One of their cost cutting measures is to print maps back to back. This is not a satisfactory solution for our customers. It creates problems when they want to assemble a county map or use light tables for overlaying the maps with other information.

The immediate concern for smaller maps is with respect to our newest inventory project (Kent county). Although we prefer to have it printed on four sheets (not back to back), the recommendation from the Cartography Unit is to print it in three larger sections.

One way to get away from this problem is to let the province pay for the map printing. All the printing for the Ministry of Agriculture and Food is coming out of one centralized budget and to secure funds out of this budget means we have to compete with other branches that think that their information is just as important as ours. We are still exploring this route for future consideration. In the meantime we would like to see an expansion of the Agriculture Canada budget to allow for more map printing.

Soil survey upgrades

Once our current five year program has ended (1991), the intent is to reduce the "full-scale" inventory programs and go with the so-called "upgrade" inventories. We feel that in general our maps are quite suitable, although they lack some essential information. For example, for about 60% of the area now covered by our soil maps we do not have map unit specific slope information, nor do we have adequate analytical data available. The lack of this information puts a severe restriction on our interpretive capability (most of the time we have to make some major assumptions).

We need a methodology for upgrading our maps. Since we are too mainly involved in current inventory projects with very little time available to do any research on the subject, we are looking to Agriculture Canada to help us develop this methodology. We would like to see this methodology in place in the early 1990's, providing us with an opportunity to test out the system before we embark on a wholesale "upgrade" program.

CanSIS

Ontario has been divided into 24 Map Groups. Southern Ontario consists of Map Groups 1 to 10 and 18 to 23. The remaining Map Groups 11 to 17, and 99 make up Northern Ontario. Each map group contains one or more counties for Southern Ontario, and one or more Districts for Northern Ontario.

At the present time, the Soil Map Unit File, Soil Name File and the Project File have been completed for map groups 1 to 10, with the exceptions of Map Groups 3 and 9. The files for Map Groups are in the process and near completion. They have not all been submitted to Ottawa due to changes in the database structure.

The Soil Layer file for Haldimand-Norfolk (Map Group 1) is at the second draft stage, and should be completed shortly. No other Soil Layer Files have been completed.

For Map Groups 18 to 23 we are waiting for the Polygon Attribute Files to be submitted from Ottawa before they can be completed.

For the Northern Ontario Map Groups, none of the files have been started except for Map Group 11 (North Bay area). The Soil Map Unit File, and the Soil Name File for Map Group 11 are in progress. At the rate we are progressing, it is anticipated that the CanSIS Attribute files cannot be completed for Ontario by the proposed completion date of March 31, 1989.

At the moment, Ontario has a number of attributes of provincial concern which we would like to add to the Soil Map Unit Files. These attribute files are primarily concerned with the soil interpretations like C.L.I., specialty crops, erosion, etc. The question is if these additional attributes do exist in the file, would they be accessible as legend information in the standard map product that has been proposed by the Cartographic Unit in Ottawa? As we understand the situation, any attributes that are in the Soil Map Unit File could be identified by a province as potential candidates for the legend for a standard map product. If this is the case, we see great potential for the standard map product that was presented to us in Guelph recently.

Digital map transfer

The Ministry of Agriculture and Food has a very high profile Land Stewardship program in place. The purpose of this program is

> "to provide grants for the adoption of conservation farming practices that will enhance and sustain agricultural production and improve soil resources and water management".

This program is in place for three years and will end by the fall of 1990. To help deliver this program at the county level, we have twenty-nine soil conservation specialists in place. One of the prime resource information packages that these conservation specialists require right now are the soil maps and interpretive maps for the various counties. In the very near future, these conservation specialists will develop their county "long term" conservation plan, for which they also need the county soil maps and the digital formats.

Having two G.I.S. systems in place, we feel this is an excellent opportunity for the Institute to work with these conservation specialists and help to develop these county plans thereby using the digital formats of the soil maps to serve their needs.

Both our G.I.S. systems use PC Arc Info software, whereas most of our digital information is in an Arc Info format (or the old CanSIS format) in Ottawa. To be able to serve the conservation specialists, we like to have the files that are currently in Ottawa being transferred to the PC Arc Info format, thus making it possible for us to develop these county plans.

Another reason why we want to get these digital map formats in Guelph is to help "replenish" our C.L.I. information for Ontario. Since the first publication of the ARDA maps in 1964, we have not updated our map files and yet we have conducted many soil surveys in the meantime. We are under pressure from the Ministry of Agriculture and Food to provide the new C.L.I. maps for those counties that have been resurveyed. We have all the information in place, it is now just a matter of getting the maps.

These are the reasons why we put a high priority on the acquisition of the Arc Info digital map files in PC Arc Info format. This is the fastest way to serve the needs of the users and will further promote the use of soil survey information in the province. From a provincial point of view we are willing to contribute funds towards the purchase of any software that will facilitate the transfer of the information from one format to the other.

Extension activities

With the provincial emphasis on soil conservation and better soil management, there is a much greater demand for soil extension work. The Institute is being recognized as having the expertise on the soils and will be more and more drawn into these extension activities. In the past we had extension bulletins (i.e. "Soil Surveys Can Help You", etc.) that were geared to farmers and ranchers. To provide soil survey a higher profile, we should not only produce the soil maps, but also promote our products by setting examples how the information can be used. Emphasizing the soil conservation and soil management aspect will greatly enhance our profile in the farming community. It is time that we, the Expert Committee on Soil Survey, take the initiative and draft a more elaborate booklet that can be of value to farmers and extension personnel. Agriculture Canada could take the lead by drafting the "format" for this booklet which could be modified by each province to suit its needs.

Summary

We make the following requests and recommendations to the Expert Committee on Soil Survey:

- that staff of Agriculture Canada return to their original positions, thus being able to finish some of the current inventory projects that are desperately needed by the province.

- that Ken Denholm's position be made permanent, maintaining the current 40% devoted to the inventory programs (at least until the 5 year program has been completed).

- we would like to encourage Agriculture Canada to proceed quickly with the development of the standard computer report formats for soil reports. We are of the opinion that this will substantially reduce the amount of time required for writing a soils report, thus freeing up time for the pedologists.

- we are very much encouraged by the current developments in the computer map printing program. We would like to suggest that these standard map formats, with some modifications, be implemented in our Niagara inventory project (and subsequent inventory projects).

- on request of our users we would like to reduce the size of our soil maps to a more manageable size. We recognize that this will increase the costs of printing maps, and therefore would like to encourage Agriculture Canada to secure the funds that will facilitate the printing of more maps.

- we would like Agriculture Canada to assist us in the development of an "upgrade methodology" for existing soil maps. The province requires this to be in place in the early 1990's.

- we would like to use the Soil Map Unit Files to be used for province specific attribute fields. We would like to use these for recording the soil interpretations, and rather then printing the soil attributes in the legend of the standard soil maps, we would like to see these attributes being listed.

- we would like to expedite the potential for the transfer of digital files between Arc Info and PC Arc Info. We recognize that Agriculture Canada is bound by an implementation program for the Arc Info system, but the need for these files by the province is urgent. Within reason, the province is prepared to contribute to the purchase of software that will facilitate this transfer.

- we would like Agriculture Canada to proceed with the development of an extension bulletin for soil conservation and soil management to be used by farmers and extension personnel.

QUEBEC REPORT TO ECSS, NOVEMBER 1988

Dominique Carrier

Les besoins de recherches dans le domaine de la pédologie sont: la classification et la cartographie des sols minéraux et organiques aux échelles régionales et détaillées; la quantification des régimes thermique et hydrique des sols; l'interprétation des données pédologiques pour l'utilisation des terres; la dégradation, l'aménagement et la conservation des sols et du milieu. Ces priorités de recherche retenues par la Commission des Sols du Québec sont bien résumées et définies dans la section pédologie de la brochure du CPVQ intitulée: "Besoins de recherche 1987-1989. Productions végétales, agrométéorologie, génie rural, sol". Les activités principales des trois organismes oeuvrant dans le domaine de la pédologie demeurent cependant surtout liées à l'étude des couvertures pédologiques (classification et cartographie) et à leur évolution en termes de conservation ou dégradation.

I. Equipes provinciales (Service de recherche en sols, MAPAQ)

A. Classification et cartographie

- Deux équipes ont poursuivi des travaux de classification et de cartographie en vue de compléter la carte des sols du comté de Frontenac à l'échelle du 1:50 000e.

- L'étude des sols défrichés de la région de l'Abitibi-témiscamingue a aussi progressé. Les levés pédologiques pour la réalisation d'une carte à du l'échelle 1:20 000e sont presque terminés. Il s'agit d'un travail important où près de 180 000 ha de terres ont pu être étudiées et cartographiées grâce au financement d'un programme spécial régional.

Les besoins dans ce secteur demeurent très importants. Il existe en effet plus de 134 000 ha de terres défrichées ou cultivées (superficie améliorée) pour lesquelles on ne dispose même pas d'une couverture pédologique de niveau 3. Il s'agit de la superficie améliorée des terres de neuf comtés (Wolfe, Québec, Montmorency, la Côté Nord (Saguenay) et la Gaspésie (5 comtés). Dans les comtés de Standstead, Richmond, Sherbrook et Compton, la couverture pédologique disponible est une étude préliminaire faite en 1941-42 à l'échelle du 1:126 720e ou 2 milles au pouce. Ce secteur comporte 116 000 ha de terres améliorées. Dans la plaine du St-Laurent, un secteur de plus de 200 000 ha à proximité de Montréal (comtés de Laprairie, Iberville, Napierville, St-Jean et une partie de Rouville) n'est doté encore que d'une étude pédologique sommaire réalisée en 1942-43 (cartes de texture de surface à l'échelle du 1:63 360e accompagnées de brèves notices explicatives).

Il est très important de pourvoir à court terme ces secteurs de données précises sur la nature, la qualité, la situation et l'étendue des ressources en terre (carte de niveau 2 et moins) afin que les intervenants du milieu puissent disposer d'unités de sol suffisamment précises pour servir de base à la production, au transfert technologique, à la recherche, de même qu'à la régie et la conservation du sol.

B - Inventaire sur la conservation des sols

C'est une étude systématique qui consiste à évaluer la dégradation des sols par l'évolution de leurs propriétés sous différents types de culture. L'énoncé de base de la méthode repose sur le fait que les contraintes imposées au sol varient avec les types de cultures et que les sols résistent à des degrés divers à ces contraintes selon leurs propriétés physico-chimiques respectives. Il s'agit en définitive d'une approche bidimentionnelle dont les deux paramètres principaux sont le sol et le type de culture.

L'unité de base en sols privilégiée dans cette étude est la série qui est une entité à variation limitée, également bien définie repérable et disponible via les travaux pédologiques couvrant une grande partie des régions agricoles du Québec. Les types de cultures retenus sont ceux d'importance: régulièrement, prairie, maïs (grain ou ensilage) et plus occasionnellement, céréales, pommes de terre, tabac, selon les possibilités régionales rencontrées. La prairie est considérée également comme témon, c'est-à-dire, comme le type de culture qui altère le moins le sol. Les propriétés physiques et chimiques mesurées sont celles permettant d'indexer les différentes formes de dégradation qui sont: la diminution de la matière organique, le tassement ou compactage du sol, l'érosion, l'acidification et la pollution.

Six équipes sous la supervision de trois pédologues seniors ont procédé au cours de 1987 et 1988 à l'étude de 200 séries de sol sur 1100 champs à travers le Québec pour un total de pas moins de 35 000 échantillons à analyser en laboratoire. Le traitement statistique des donées va débuter sous peu.

C - SIQSOL

C'est le système d'information québécois sur les sols. Cette banque de données, dont la réalisation est amorcée depuis un an, devra d'une part, gérer l'information générale sur les sols et d'autre part, gérer l'information spécifique aux projets d'études.

Le modèle conceptuel des données et l'architecture des traitements sont complétés. La programmation va débuter en novembre.

II - Equipes fédérales

A - Classification et cartographie des sols

Les activités de cartographie dans la plaine du Saint-Laurent touchent à un comté, celui de Rouville. Au cours de 1988, seulement deux équipes ont effectué des levés pédologiques dans ce territorie et elles ont couvert en tout 10 000 ha. Il faut doubler et tripler les effectifs pour accélérer les travaux dans ce périmètre à proximité de Montréal où il y plus de 200 000 ha de terres soumises à une utilisation intensive et à un aménagement diversifié sans disposer des données pédologiques nécessaires pour effectuer des choix judicieux. Rétablir les effectifs actuels de ce groupe à ceux indiqués dans la Convention de 1973 signée entre Agriculture Canada, Agriculture Québec et l'Université Laval et orienter prioritairement les activités de ces effectifs à la classification et à la cartographie des sols seraient un grand pas pour corriger à court terme cette grave lacune.

La rédaction du rapport des études pédologiques des comtés de Chambly et de St-Hyacinthe est en cours.

B - Projets spéciaux

1. ARC/INFO

Les cartes pédologiques des comtés de L'Islet, Rivière-du-Loup, Richelieu et Verchères ont été numérisées et les fichiers de la base de données partiellement complétées.

2. Evaluation des facteurs édaphiques influençant la productivité forestière.

3. Evaluation des facteurs édaphiques influençant la productivité et la gestion (approche intégrée) des sols organiques pour la culture de l'oignon et des carottes.

4. GSLM

Il s'agit d'une carte généralisée des pédopaysages du Québec (1:1 000 000). Celle-ci a été effectuée pour l'ensemble du Québec méridional.

III - Equipes de l'université Laval

A - Classification et cartographie des sols

L'étude de 55 000 ha de sols agricoles, dans 23 paroisses du comté de Rimouski est au stade final. Cette étude effectuée à l'échelle 1:20 000, au département des sols de la Faculté des Sciences de l'Agriculture et de l'Alimentation, sous la supervision du Service de recherche en sols du MAPAQ, en est à la rédaction du rapport et à l'impression des cartes.

B - Projets spéciaux

- Etude de l'érosion en utilisant CS137 comme traceur
- Influence des rotations sur les structures
- Pratiques culturales et température
- Compost
- Biodégradation et valorisation agricole des résidus de la pêche
- Amélioration foncière des sols
- Transfert de particules et matière organique
- Métabolisme du carbone et fixation d'azote

NEW BRUNSWICK REPORT TO ECSS, NOVEMBER 1988

John MacMillan

The Soil Survey Program in New Brunswick is directed towards obtaining the maximum returns per land unit and at the same time emphasizing soil conservation. To accomplish this, we attempt to provide farmers and agrologists with the necessary soil information required to make wise land management decisions. In this regard, we are more concerned with the edaphological aspects of soil survey than the pedological aspects.

Our program consists of six sub-programs all designed towards developing an integrated approach to land management.

On Farm Soil Surveys

This program was started in 1980. Since 1986, we have been averaging between 25 and 30 farms per year with an average of some 300 acres per farm. Detailed soil surveys are done on each farm and from the data gathered a series of interpretative maps is produced using computer drafting techniques. A report is prepared and the maps and reports are discussed with the farmer and local agrologists.

When conducting on-farm surveys the need for more correlation within the Province becomes very apparent, especially in the area outside the potato belt. The lack of correlation is not due to lack of desire on the part of the Federal or Provincial Soil Surveyors but more on the low priority given correlation by the administrators. I would request that greater priority be given correlation so that knowledge available at present can be utilized in the correlation process before it is lost forever. In doing the interpretations for the on-farm surveys, we find there are problems in assessing the potential of certain soils in relation to crop productivity. Greater efforts in developing guidelines relating soil and climate information to specific crops is required.

Geographical Information Systems (CARIS)

In addition to the on-farm soil survey maps, all relative land information is entered in this system. This includes land improvement data, livestock feed data and much more. Efforts are underway to make the system compatible with other land information systems such as CANSIS. Data retrieval and manipulation will enable us to provide much better information on land management.

Applied Research in Land Management

Much of our work involves applying or adapting research from other areas to land in this Province. Such things as deep rooted crops for land improvement, tillage practices for soil improvement, fertility applications (especially micronutrients and soil stabilizing compounds for erosion control) and anticrustants are only a few of the projects we have been involved with.

Much of our work is directly involved with the farmer. As professionals we tend to assume that the farmer has an endless supply of money for land

improvements and management. We need to look at more practical methods of land improvement and management if we are to serve the needs of the farmer and promote soil conservation. The term "bigger and better" does not apply too well to New Brunswick.

Applied Climate Research

Climate information is important in land management. While much of the climate work involves data collection and preparation of climate related maps, we are also involved in applied climate manipulation research with a view to extending the growing season for specific crops.

Interpretation of Existing Soil Survey Information

Our work involves the presentation and/or interpretation of existing information for a number of disciplines besides agriculture such as environment, transportation, forestry and recreation, etc. It does seem of late that the general public is putting more emphasis on soil information.

Our requests originate from all over the Province and we find that in some areas there is a lack of information on which to make interpretations. While some information is available in-house, areas like Chipman-Minto-Harcourt, North Central New Brunswick, Salisbury and the Gloucester Peninsula should be assigned greater priority so that the information can be published and made more readily available.

Soil Extension and Liaison

Our extension activities include the promotion of soil survey information as an important tool in land management and trouble shooting of soil problems as they relate to crop production. The latter usually involves one-on-one contact with the individuals at the site of the problem. Our liaison consists of contact with federal and provincial soil surveyors, or others involved in soil survey work, so that exchanges of information can be made and we can keep informed of the latest developments.

While provincially our work involves mostly farmers, we do spread the message to the general public and to other disciplines such as Highway Engineers and Environmentalists. The proposed Soil and Water Conservation Centre for Eastern Canada, the National Soil Conservation Program and National Soil Conservation Week are very positive undertakings in promoting soil conservation and land management. I would ask this committee to endorse and fully support these efforts.

SUGGESTED INCLUSIONS IN THE NOVEMBER 1988 ECSS PROVINCIAL REPORT

H.W. Rees

1. Continued inventories to satisfy the needs of agricultural land management, development and conservation in New Brunswick. This will include both detailed regional resurvey of intensively used agricultural areas and on-farm survey. Land resource information is urgently needed to provide rationale for the decision-making associated with the two major federal-provincial programs that are being negotiated on soil conservation (NSCP) and land development (AFDA).

2. The National Soil Conservation Program (NSCP) is being negotiated in New Brunswick. This tripartite arrangement with farmer, provincial government, and federal government involvement is required to combat the serious soil degradation that is occurring in New Brunswick. Tentative programs have been developed in: awareness, research, technology development and adaptation, technology demonstration and transfer, decision-making support and analytical services, technical services, financial assistance and incentives and capital works, human resource development, and coordination. Soil inventory has a vital role to play in this program. NSCP has the potential of having more impact on the role of soil survey than any of the major events in the discipline since soil classification and the CLI. The ECSS should officially support this initiative.

3. Expanded efforts are required in agricultural interpretations. This includes the quantification of crop yields in crop suitability guidelines and the establishment of interpretive guidelines for such land improvement activities as land clearing, subsoiling, and subsurface drainage. The work of the ECSS Working Group on Agricultural Interpretations is applauded.

4. Forestry - There is a growing need for increased soil survey involvement in forestry related activities in New Brunswick. With the impending wood shortage on the not too distant horizon, forest site classification is seen as an effective decision making tool to identify sites which warrant greater inputs. Methodologies are required for conducting detailed soil surveys in forested areas.

5. Correlation - Improved regional correlation is required if we are to benefit from the advances made in other parts of Atlantic Canada. Most of the existing Agriculture Canada research efforts carried out by the different Research Stations are intended for regional application. Without regional soil correlation this is not possible.

6. Extension and education are also priority issues in New Brunswick. There is a need to provide extension workers and educators with more information on the vital role of soils in agricultural production, and of the potential uses of soils information.

7. In August 1988 the Federal Minister of Agriculture, Mr. Pierre Blais, announced the federal government's support for the establishment of a Soil and Water Conservation Centre for Eastern Canada in Grand Falls, New Brunswick. The New Brunswick provincial government has indicated that it will provide some financial support. The need for such a centre has been identified in numerous studies and reports. This increased effort in soil and water related

activities is most appropriate given the complementary thrusts in soil conservation and land improvement that are taking place in the province. It is recommended that the ECSS also lend its support to this initiative.

8. The soil wetness - undesirable soil structure problem also remains a top priority issue in New Brunswick. Better characterization and classification, and the identification of ameliorative methods of correcting these situations, are required.

NEWFOUNDLAND REPORT TO ECSS, NOVEMBER 1988

J. van de Hulst

This report briefly outlines Newfoundland's soil survey and related activities during 1987 and 1988, and some concerns related to these activities.

Soil Survey Activities

Soil survey and data collection continue to be high priority concerns in Newfoundland. It is realized that a properly scaled soil survey database is a prerequisite to sound agricultural planning.

The last of the exploratory soil survey coverage of the island of Newfoundland, consisting of the Belleoram-St. Lawrence and the Stephenville-Port aux Basque mapsheets, were finalized, thereby completing the total soil survey coverage of the island at a 1:250,000 scale.

The Reconnaissance soil survey program has slowly come to a stop. The soil survey of the St. Fintans mapsheet and the soil survey of the Flat Bay-Main Gut area were finalized, while soil survey projects in the Musgravetown area and the Goose Bay area in Labrador were put on hold. With these soil surveys completed, the major areas with potential for agriculture will be covered by reconnaissance soil surveys ranging in scales from 1:15,000 to 1:100,000. These soil surveys cover approximately 2.1 million ha. which is a little less than 20% of the insular portion of the province.

During the past two years, a large part of the soil survey effort was concentrated on eight detailed (1:12,500 scale), mostly single purpose, soil surveys in answer to specific requests from government and farmers' organizations. These surveys covered approximately 28,700 ha. The largest of these surveys (approx. 18,000 ha.) was the soil survey of the St. John's Agricultural Development Zone.

Phase 1 of the General Soil Landscape Mapping (insular portion of the province) was completed by the L.R.R.C. soil survey unit in St. John's. Phase 2 of the General Soil Landscape Mapping (the Labrador portion of the province) was postponed.

This year, the province has initiated its Provincial On-Farm Mapping program. It is a service offered to farmers to assist them in farm management and planning. Besides soil survey and soil suitability maps at 1:2,500 scale, the service provides the farmer with farm property maps. The intention is to provide the farmer eventually with a sound soil and land management plan for his farm, based on soil survey and other data to be collected over a number of years. The past field season saw soil surveys completed for 11 farms. This program will be the major soil survey effort for the province for the next number of years.

Soil Survey Related Activities

The Soil Names files for Newfoundland was cleaned up early in 1987 in a combined effort by federal and provincial soil surveyors. This effort culminated in the publication "Soil Names of Newfoundland".

The report titled 'Pedoclimatic Zones of the Island of Newfoundland' was finalized by the L.R.R.C. soil survey unit in St. John's and was recently published. This publication describes the highest level of stratification for soil mapping in the province.

The reorganization of CanSIS demanded the major part of the work schedule of the L.R.R.C. soil survey unit in St. John's. Their contribution to project 88-35, Map Attributes, was completed and submitted to Ottawa. SNF, SLF, SMUF and Project Files were delivered to Ottawa in September, 1988. Work is presently underway by the cartography section of L.R.R.C. to convert digitized maps to ARC.

Soil suitability interpretation guides for various crops and soil uses for Newfoundland were expanded upon. To date, interpretation guides exist for 8 different crops and soil uses. These interpretation guides have now been in use by the provincial soil surveyors for the past two years, although only two interpretation guides, soil suitability for forage (hay) production and soil suitability for use as pasture, have been adequately tested so far.

Other Activities

After 6 years of data collection, the province's effort in temperature data collection in the major agricultural areas was discontinued due to an expansion of the Atmospheric Environment Service network into these areas.

The provincial soil survey unit acquired a PC supported ARC/INFO system, primarily for its On-Farm Mapping program. This system is scheduled to be up and running this winter. Soil attribute files for most of the detailed soil surveys have been entered. Algorithms for most of the soil suitability guides have been written for fast retrieval of soil suitability ratings.

Two Canada/Newfoundland agreements on Agriculture were signed and are in place. The Atlantic Livestock Feed Initiative (ALFI) and the Agri-Food Development Subsidiary Agreement (AFDSA). The provincial soil survey unit is actively involved in the Technology Enhancement program of the ALFI and is managing the Soil and Land Management Program of the Agri-Food Agreement. Several on-farm demonstration projects are being implemented by the provincial soil surveyors, ranging from fertility trials to land clearing and land development demonstrations.

An agreement has been reached between Canada and Newfoundland regarding the National Soil Conservation Program (NSCP). A workplan has been developed and is in the final stages of completion.

Concerns

The province recognizes the need for a sound national soil survey database management system (CanSIS). The province also recognizes the potential of the National Soil Conservation Program (NSCP). However, it is somewhat concerned about the amount of time these two programs demand from the L.R.R.C. soil survey unit in St. John's. Due to these programs, activities on a number of soil survey projects, important to the province, have been postponed.

Interpretations of soil survey data for agriculture and other uses are the final results of soil surveys. Little progress has been made in the development of adequate soil survey interpretation systems. The province feels that efforts in the development of interpretation systems should be increased, thereby recognizing different needs for different provinces.

STRATEGIES FOR FEDERAL SOIL SURVEY: PRIORITY SETTING

EXPERT COMMITTEE ON SOIL SURVEY: 8TH MEETING

WINNIPEG, MANITOBA

15TH NOVEMBER 1988

Aggregate Ranking of Tasks Using the Nominal Group Technique

An "unofficial" exercise was conducted to provide some direction for future programming in LRRC. It was done at this time to take advantage of the input from provincial (and federal) collaborators and users of information as represented at ECSS.

The process used was essentially that of the Nominal Group Technique (NGT) where a process facilitator lead the group through a structured decision making series of exercises.

1. The Task was defined and 5 groups formed.
2. All pertinent issues were brainstormed.
3. Groups defined and priorized 10 top tasks.
5. All tasks were rated using the criteria and ranking established.
6. Discussion of results.

Following are the results of the exercise.

The Participants

ECSS WINNIPEG November, 1988

Working Groups - Priorities for Federal Soil Inventory

WG 1

Luttmerding
MacMillan
Dickinson (Leader)
Coen
Smith, R.E.
Veer
Veldhuis

WG 2

Moran (Leader)
Anderson
Rees
Acton, C.
Tarnocai
Walker
Michalyna

WG 3

Carrier
Mackintosh (Leader)
Woodrow
MacDonald
Howitt
Eilers
Racz
Edwards

WG 4

van den Broek
van de Hulst
Harron (leader)
Smith, C.A.S.
Cossette
Green
Shields

WG 5

Mills (Leader)
Haddon
Schrier
Acton, D.
Webb
Pettapiece
Fraser

GENERAL AGGREGATION OF TASK LIST*

8	A	Develop improved methods for Soil Survey data collection
4	B	Develop improved methods for data analysis, management and presentation
10	C	Extension, education and training
4	D	Land evaluation/alternative land use
3	E	Systematic soil survey of agricultural land
11	F	Systematic soil survey of forest and other land
1	G	Establish and test national and regional interpretive guidelines and criteria
1	H	Monitoring and modelling changed land quality
12	I	Input to national policy
4	J	Development and maintenance of national GIS database
7	K	Regional and national correlation
9	L	Special purpose surveys for other agencies

* based on the following working group lists

CRITERIA*

3**	I	Mandate
3	II	Demand
2	III	Current land management significance
1	IV	Contributes to environmental goals
1	V	Professional/support staff available
1	VI	Compatible with provincial priorities
1	VII	Unique regional importance
1	VIII	Supports programs of other agencies
2	IX	An achievable and deliverable product
1	X	Anticipated cost benefit positive

* based on the following working group lists
** weighting

Tasks for Soil Survey (Working Group 1)

1. Land evaluation for alternate uses and interpretation
2. GIS development and applications
3. Development of interpretation methods
4. Method of presentation of information
5. Correlation
6. Monitoring of changed land quality (& climate)
7. Cooperation with other agencies
8. Generalized soil map
9. Clarification of client groups and target
10. Public awareness and education
11. Land use mapping
12. Staff development
13. Research and genesis

Tasks for Soil Survey (Working Group 3)

1. Mapping function
   - generalized soil maps & soil maps at scales appropriate for region & specialized mapping functions
   - upgrading function
2. Maintenance of national GIS including CanSIS; ARC for system
   - verify, update, maintain soil attribute files
   - update and input additional coverage
3. Prepare soil maps and reports for distribution including cleanup of backlog, standard computer formats
4. Correlation - national correlation function includes:
   - minimum standards, guidelines for mapping, computer format, lab analysis, data reliability, alternate data sources
5. Interpretation of soil inventory data for mineral/organic soils
   - upgrading/verification of existing systems
6. Interpretation of soil inventory and other data for land evaluation purposes, e.g. climate, soil water, land use, process oriented research
7. Processes of soil degradation including process oriented research, modelling and monitoring demonstration plots and field research
8. Soils and environmental quality
   - research
   - soil pollution and contamination
   - problem soils
9. Education & Training
   - public relations and awareness
   - extension to promote use of soil surveys
   - maintain training function for field mapping, etc.
10. Technological development & evaluation
    - GIS mapping system
    - more efficient method for storing and analyzing information
11. Prepare contract specifications
12. Support of smaller regional units

Tasks for Soil Survey (Working Group 5)

1. Soil Survey of agricultural land
2. Establish national interpretation guidelines and criteria
3. Monitor soil degradation
4. Input to national policy
5. Maintain effective soil survey database
6. Regional and national correlation
7. Detailed soil survey of special projects
8. Simulation modelling of degradation processes
9. Testing and verifying soil interpretations
10. Develop improved methods for soil survey
11. Extension
12. Land evaluation
13. Establish criteria and methods to define soil quality

Criteria (Working Group 2)

1. Task is of national concern
2. Within mandate/jurisdiction
3. There is demand
4. Current agricultural significance
5. Environmental implications
6. Availability of expertise
7. Optimizes sustainable resource development
8. Cooperative federal-provincial
9. Unique, regional importance
10. Supports other federal-provincial availability of manpower

Criteria (Working Group 4)

1. Expressed Needs
2. Relationship to current land use problems
3. Benefits to agriculture
4. Deliverable products
5. Funding available
6. Agriculture Canada mandate
7. Cost/Benefit to User
8. Regional Impact
9. Professional/support staff available
10. Compatible with provincial policies
11. Environmental considerations
12. Anticipated Results
13. Current Methodology (existing)

Working Group Tasks	1	2	3	4	5	Average	Rank
A	111^{8}*	112^{8}	103^{8}	114^{5}	99^{6}	108	8
B	126^{2}	115^{4}	124^{5}	109^{9}	114^{3}	118	4
C	100^{10}	83^{11}	96^{9}	110^{8}	98^{7}	97	10
D	121^{4}	122^{2}	121^{6}	112^{6}	112^{4}	118	4
E	133^{1}	113^{6}	132^{2}	121^{2}	95^{9}	119	3
F	108^{9}	88^{10}	87^{12}	107^{10}	88^{11}	96	11
G	120^{5}	119^{3}	130^{3}	125^{1}	119^{2}	123	1
H	116^{6}	113^{6}	152^{1}	100^{11}	131^{1}	122	1
I	85^{12}	78^{12}	90^{10}	97^{12}	79^{12}	86	12
J	122^{3}	126^{1}	127^{4}	121^{2}	93^{10}	118	4
K	112^{7}	115^{4}	110^{7}	111^{7}	96^{8}	109	7
L	91^{11}	102^{9}	88^{11}	118^{4}	101^{5}	100	9

*superscripts are the working group rankings for each task

Discussion

(All statements are paraphrased).

Gerry Coen:
Ranking of priority tasks is somewhat schizophrenic - GIS is rated highly, yet correlation is rated low.

John Nowland:
This may be because correlation is long term rather than short term. New correlation may really be systems (database?) development. The broad nature of some tasks may also have caused a ratings problem.

Keith Valentine:
Item J (Dev. of national GIS database) was ranked #4, but had a wide spread in ratings between groups.

Con Veer:
Correlation is now imbedded in GIS SNF & SLF automatically when pedologists are required to specify these soil properties.

John Nowland:
Reassuring that Monitoring has come out as a high priority. Change in soil properties with time is also important, not just change over distance.

Trevor Dickinson:
Discrimination of tasks near the bottom of the list may be more distinct than those near the top. This is also useful.

Erwin Mackintosh:
It is unfortunate that results are affected by grouping of activities. Differences in provincial and federal priorities are also reflected in these ratings.

Steve Moran:
How can Public Relations (Item C) be one of your low priorities (10th place)!? The B.C. provincial soil survey was dissolved because of lack of interest in this issue. We may come back to future ECSS meetings with an even smaller group of soils people with less influence if we don't pay more attention to PR. Perhaps the low ranking is because the topics of awareness, training, and education were all lumped together.

John Nowland:
Education and public awareness is not our mandate.

Erwin Mackintosh:
How can publicity of your mandate be a problem? We're not talking about provincial Extension personnel jobs per se when we consider the need for PR.

Don Acton:
This goes beyond the need for glossy LRRC annual reports. It must include actual working level meetings with other agencies and the public.

Gerry Coen:
We should be more active in working with the Communications Branch on these things.

Hans Schrier:
Soil survey (inventory) seems to be ranked high here, yet the demise of the B.C. Provincial Soil Survey shows that in B.C. soil inventory clearly has a lower ranking.

Don Acton:
Just the opposite is true in Saskatchewan. There is lots of provincial support for soil inventory.

Hans Schrier:
The 1987 Soil Survey Handbook has nothing on computer databases (CanSIS) - this a real deficiency.

Keith Valentine:
Topics E & F (Systematic Soil Surveys of Agricultural land, and Forested and other lands, respectively) came out high in several working group ratings. Why?

Con Veer:
Everything else we do is clearly based on inventory information. There is far more work in the field left to do than we think.

Hugo Veldhuis:
There is both a high demand and trained staff for inventory in Manitoba. The guidelines (criteria) will naturally show a high rating in this area.

Erwin Mackintosh:
Other items in the criteria used are also contributing to the high ratings for inventory work.

Wayne Pettapiece:
Don't Provincial people have a higher mandate to do Inventory work in agricultural areas than Federal staff?

Steve Moran:
My observations are that the criteria almost guarantee the outcome. For example, extension activities are rated low while mapping is rated high. It is systematic in the criteria and weighting process.

Trevor Dickinson:
This process may serve to perpetrate the status quo.

Keith Valentine:
There are 12 task identified, but only 2 are new. This may or may not be valid.

Jack Shields:
The ECSS experts in this meeting have decided it is valid.

Don Acton:
Look at the bunching of results. Item E (Systematic Surveys of Agricultural Land) in third place is not that far removed from seventh position (Regional and National Correlation).

John Nowland:
Input to National Policy may be an important objective, yet it was ranked twelfth (last).

Walter Michalyna:
The problem may be with our focus here on the current framework, that is, an approximate 1 year time span, rather than needs in the longer term. Items such as Input to National Policy belong in the longer term category. Criteria such as current staff support will always come out as a low rating for new initiatives.

Scott Smith:
It was doomed from the beginning by the criteria used. Perhaps the reason LRRC is under scrutiny is because we haven't responded to national policy development in the past.

John Nowland:
The National Soil Conservation Strategy has been somewhat of a failure. Perhaps a "bottom up" approach is more useful, I acknowledge that I'm suggesting this from a "devils advocate" position.

Steve Moran:
Regional disparity in rankings may be the result of the working group composition.

Bill Harron:
The discussion of the issues with fellow working group members may have been more important than the final numerical results.

Bob Eilers:
I have a much more positive feeling about the final analysis of the results. For example, the Monitoring and modelling of changed land quality was given increased recognition of importance (tied for first place).

Geza Racz:
It is very important that LRRC make its soil information databases available so that users can get out of it what they want. The collection of data that can't be readily used is not a useful process.

Bob Smith:
Pedon characterization has to be recognized as a vital part of the soil mapping process. This is apart from its usefulness for soil correlation.

Steve Moran:
From our experience in the Alberta Research Council, I think it would be a mistake to divorce yourselves from soil inventory and inventory database management. Don't concentrate totally on applications.

Erwin Mackintosh:
5 of the top 6 tasks (except for inventory) all deal with improving GIS databases and input/output formats.

END OF FORMAL DISCUSSION (5:00 PM)

WORKING GROUP REPORTS

EXPERT COMMITTEE ON SOIL SURVEY: 8TH MEETING

WINNIPEG, MANITOBA

16TH NOVEMBER 1988

SOIL CLASSIFICATION WORKING GROUP REPORT

C. Tarnocai

1. Publication of the second edition of The Canadian System of Soil Classification book

In July, 1986 D.S.S. indicated that they had no more English copies of this book. A new printing of this book was urgently needed since universities use it as a text book for their soil classes. It was decided that the new edition would include all those changes which had been approved by the E.C.S.S. (Tarnocai 1984). The revised copy of the book was prepared in the spring of 1987. The printing of this second edition was completed in August, 1987 with 2000 English and 1000 French copies being printed.

According to D.S.S. records, 800 English copies and 200 French copies of the book have been sold per year in the past. D.S.S. routinely prints only two years' supply; as a consequence, a reprint of this book will probably be needed in the early 1990s.

2. Current status of work on soil classification problems

a. The adequacy of the current chemical criteria for a podzolic B horizon.
This work has been completed and published (Wang et al. 1986, Wang and Kodama 1986, Wang in press and Ross et al. 1985) and it has been recommended that the hydroxylamine and ammonium oxalate tests be used to determine the iron and aluminum.

b. Classification of swelling clay soils.
The work has been completed and recommendations have been made relating to the Canadian soil classification (Dasog 1986). Results of this work were also presented in a poster session at the Hamburg I.S.S.S. Congress with recommendations for changes in both the Canadian and American soil classification systems.

c. Lower case suffixes for the L, F, and H horizons.

i. A proposal relating to the humus horizon suffixes was presented by C. Fox at the 1984 Soil Classification Working Group meeting (Fox 1984). It was decided at that time that further testing of this proposal was required.

ii. The micromorphological testing of this proposal has now been completed and the results will be published by C. Fox.

iii. C. Fox will present the revised proposal during the next Soil Classification Working Group meeting.

3. Recommendation

It is recommended that the Soil Classification Working Group meet within the next two years to deal with the soil classification problems.

4. References

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CANSIS WORKING GROUP REPORT

B. MacDonald/G. Patterson

RECOMMENDATIONS TO THE EXPERT COMMITTEE ON SOIL SURVEY
from the CanSIS Working Group arising from the meeting Sept. 26-28.

1. That the standard attribute file structure and organization be reviewed by a database expert to ensure that the design is sound and reliable. (strongly supported).

2. That Ottawa will be the archive location/facility for all files associated with map attributes. Copies of the files containing provincial fields will simply be copied to tape and stored; the standard attribute fields will be verified and transferred to the appropriate file. The region will be responsible for the data and any update of these files.

3. That the EDP objective of the Inventory section of LRRC is to establish regional EDP capability to the level of 1 computer unit per person, 1 GIS workstation to access Ottawa per unit and, based on regional needs and national priorities, to establish access to local GIS capability. The nature of this access will be part of the MOU's currently being negotiated between LRRC and the provincial agencies; particularly where joint or shared equipment and software is involved.

4. For upgrade and/or replacement of EDP equipment: That LRRC will define minimum EDP configurations by function. When a unit's equipment falls below this minimum, replacement will not require justification. Other equipment acquisition to upgrade and/or replace will require justification based on performance needs.

   The general functions required were identified as follows, along with the individuals who will prepare the specifications:

Word Processing and Desk top publishing	- G. Padbury and J-M. Cossette
Database Management	- C. Fitzgibbons and vice Jones
Statistical analysis	- J. Tajek
Regional GIS	- D. Moon

5. That software licenses are to be purchased for any software which is being used in violation of copyright. Current holders of software licenses are entitled to upgrade when new versions are released by the vendor if budget is available. Acquisition of new licenses or change in software packages require justification on the basis of required functionality and/or enhanced performance. Items under $500 will continue to be purchased under local purchase orders and will be added to the annual update of the EDP inventory.

6. That no maintenance contracts will be taken unless they can be justified on the basis of cost, risk or required support.

7. That facsimile machines are not part of EDP equipment and therefore not part of the EDP plan.

8. In recognition of the developing need for increased computing power and flexibility, that the CanSIS working group or a subcommittee will carry out a problem definition, needs analysis and justification for the additional capacity required and outline the options available (e.g. LAN, multitasking system, etc.). The CanSIS working group recommends that G. Coen be contacted and asked for J. Tajek's time to carry out this task.

9. That the sequence of events for preparation of update to annual long-term EDP plan is that:

   - within each unit the CanSIS rep will update that unit's portion of the plan listing the additions to the EDP inventory for the year and describing planned acquisitions with priorities and justification described within the context of the general EDP objective including unit's definition of local GIS capabilities and regional needs and national priorities. EDP acquisitions will be prioritized and also the requirement compared against other equipment required by the unit.

   - the Head of CanSIS, Head of Inventory and one regional representative (currently D. Moon) will review all requirements from the regions and Ottawa. These will be prioritized for a list of requirements to present to the LRRC EDP committee and Treasury Board for approval and also for LRRC management for allocation of equipment funds.

   - a copy of the current version of the long-term EDP plan including acquisition priorities will be provided to each CanSIS rep.

10. That the mandate for the CanSIS Working Group be revised to read as follows:

    - To guide the future responsibilities, activities, and organization of CanSIS by providing advice about requirements and deficiencies.

    - to carry out some resulting tasks that fall within the field of computerized information systems.

11. That the possibility of a cooperative project with EMR be actively explored. It is suggested that any proposed project consider studies involving topographic information, land use and other sources of data. That the project consider data sources and resolution available and investigate combinations of coverages. General area of interest is in the land degradation studies, e.g. PEI and BC Peace region.

12. That the availability of standard archive procedures for micros from SCD be investigated. If none is available, that a project be defined or that the procedures be developed and documented on contract.

13. That the mapping systems working group, the SWIG group and the agronomic interpretations working group be asked to assist in developing procedures for new surveys and upgrading existing ones to provide the range of types of data required at appropriate levels of reliability. That classification of reliability levels be developed and that interpretations be adapted to the available data to demonstrate and test the attribute files.

SOIL SURVEY HANDBOOK

G.M. Coen

Since my last report to the ECSS in 1986, Sections 100 to 400 of the Soil Survey Handbook have been published in English and French, and are available from LRRC in Ottawa or from me in Edmonton. I hope most people have had a chance to review the contents, but emphasis on creating a national digitized database and the National Soil Conservation Program have both diluted our efforts. I expect that both federal and provincial interest in electronic databases will have emphasized the need for standardization. The Soil Survey Handbook was created in anticipation of this need.

Given the shift in emphasis over the last few years, it is opportune to review the objectives of the Soil Survey Handbook and assess where we are in meeting them. When John Day introduced the "Soil Survey Procedures Handbook" at the ECSS meeting in 1981 he stated in part ".... our most important need is to document procedures in use for the purpose of establishing uniformity of standards and methods ...". The need for standardization keeps growing as we implement automated data handling procedures. Not incidentally, the need for standardization also grows as we have less time to provide apprenticeship training via the "Old Boys Systems". As I mentioned in 1984, it is my belief that if our procedures are properly recorded, novice surveyors should be able to obtain most of the answers to procedural questions from the literature.

It was our concept to provide the "glue" that would bind together the handbooks that we already have in place, such as "The Canadian System of Soil Classification" and the "Soil Mapping Systems for Canada". The handbook could also provide a home for new procedural documents until it was felt they should be independently published. For example, Jack Shields has been working on proposed changes to Soil Survey Form 1 and Correlog. Both of these documents were included in the first release of the Soil Survey Handbook. At the time these two documents were first developed it seemed that the best way to make them available to a wide range of users was to include them in the SSH. We envisioned that when we adopt changes all we have to do is print replacement pages and send them to persons in possession of the Soil Survey Handbook. The organization of the handbook was set up to allow for additions and deletions. Also, C. Tarnocai, J.M. Cossette and C. Acton have been working on proposals that are meant to help standardize soil survey report presentations. The original contents list of the SSH suggested that this type of information should be included in Section 701. When we have reached a decision on procedures we can slot them into the handbook. When the procedures have matured to where they are published independently they are removed from the Soil Survey Handbook and replaced with a brief synopsis and a reference to the independent document. Thus the Soil Survey Handbook can act as a vehicle to test the reaction of a cross section of the inventory community represented by the ECSS and its working groups.

Progress has been slow since Sections 1 to 4 were published. Section 500 editor Bob Smith has also had difficulty generating enthusiasm even though the soil survey committee has become increasingly aware of the need for better and more standard interpretations. With the release of the report on Interpretations for Forestry and activity by the National Agricultural Interpretations Working Group there should soon be material available to fill

part of the void in Section 500. It matters not whether it is published as part of the Soil Survey Handbook or independently with a brief reference in the SSH.

A manuscript for Section 600 has been roughed out. The procedures for entering and documenting maps in CanSIS-Arc/Info logically need to become part of Section 600. The review and update of the manuscript requires an identified commitment on the part of the editor and several contributors.

Section 700 has not progressed since Terry Lord retired. Results of the efforts to standardize soil survey report and map presentation should provide a contribution to Section 700 - Information and Display Systems.

I still believe that the Soil Survey Handbook is a vital contribution bridging our major publications. To be effective, an opportunity must be provided to provincial, university and other members to be part of the process by which the publication develops. Hence, the importance of the Editorial Lead Committee and the Expert Committee on Soil Survey under whose auspices it operates. I hope that the release of Volume 1 will provide the stimulus to continue with the remaining Sections. To achieve any progress in today's working climate, persons undertaking contributions to the Soil Survey Handbook must have the responsibility recognized in their Organization's work plans.

AGRONOMIC INTERPRETATIONS WORKING GROUP REPORT

W.W. Pettapiece

I. Introduction

1. Background

Starting in 1938, and more particularly in 1945, the then Canada Soil Survey Committee provided a coordinating role in soil survey procedures and interpretations. The major effort in developing the CLI - Soil Capability for Agriculture in the early 1960's is a prime example. However, since that time agronomic interpretations have been essentially left to regional or local efforts. This did address local problems, and it still involved federal, provincial and university people, but it also led to some balkanization of procedures, duplication of effort and a less than ideal exchange of information. We now have a collage of regional modifications, and in some instances more than one in a single province.

Over the past number of years concern has been expressed about the need to upgrade, rationalize and expand the agricultural interpretations based on soil surveys. The issue was raised by ECSS, by provincial advisory committees and by individuals within the survey community. The development and coordination of soil interpretation was seen as a federal responsibility and, in the fall of 1986, K. Valentine approached W. Pettapiece with a request to establish a federal working group to address the issue.

The soil survey units across Canada were contacted and a working group formed with representatives from each of the provinces and Ottawa. A compendium of the present interpretations used in each province was compiled and circulated. A workshop was held in August, 1987 where the problem was discussed, the present situation and interpretations reviewed and an action plan developed (Appendix 1).

2. Terms of Reference

The overall charge to the working group was interpreted as:

Objective: to coordinate LRRC activities directed towards soil interpretations for agricultural purposes.

This was a broad mandate with the following interpretations identified as falling within the purview of the objective:

a) biological (crop production)
   - capability, suitability, productivity
b) degradation
   - wind and water erosion, K factors
c) management/reclamation
   - drainage, compaction, tillage
d) others
   - irrigability, grazing
e) land evaluation

It was clear that the working group could not address all of the interpretations, and some of the topics were being dealt with by other projects. It was decided that this group should restrict its efforts to a 3 year phase looking specifically at the biological interpretations of capability and suitability. Three areas of activity were specifically identified:

Aims: a) to upgrade the present CLI-Soil Capability for Agriculture to a truly national system.
b) to develop consistent suitability tables for the major cereal, oilseed, vegetable and fruit crops in Canada.
c) to foster awareness and coordination in the kinds and nature of agricultural interpretations in Canada.

3. Working Group Membership

Subsequent to the workshop in 1987, a decision was made to consolidate the representatives from Atlantic Canada to one person to represent the region. At the same time the need to coordinate with related projects was identified and ex-official members from Soil Quality, Land Evaluation and Agrometeorology were added.

The final membership included in the primary group:

Atlantic Region	- D. Holmstrom
Quebec	- M. Nolin
Ontario	- E. Presant
LRRC	- S. Mathur
Manitoba	- R. Smith
Saskatchewan	- G. Padbury
Alberta	- W. Pettapiece (Chairperson)
British Columbia	- A. Green

and for additional input and coordination:

Agrometeorology	- A. Bootsma
Land Evaluation	- J. Dumanski
Soil Quality	- C. Wang
Yukon	- S. Smith

In order to satisfy the aims it was obvious that provincial people would also need to be involved in the process and each member was asked to establish a provincial (regional) working group.

II. Decisions and Actions Arising From '87 Workshop.

Discussions arising from the review of existing interpretations led to a number of conclusions, decisions and supporting actions.

1. Conclusions

a) Requirements for a national system
- we should keep the "CLI" capability approach
- we should document and address weaknesses in the "CLI" as now used
- we should add the "unit" category
- we require a national climate framework

b) Climatic considerations
   - climate should be assessed separately from soil and landscape features
   - climate could be recognized at two levels, a broad regional framework and a more detailed local assessment

c) Local interpretations
   - crop specific "suitability" ratings should be developed for local use

d) - we need to validate our interpretations but that will be beyond the present three year phase.

2. Activities

- deficiencies in the CLI were documented
- other systems were reviewed
- the Alberta system was tested in Nova Scotia and Quebec.

III. Decisions Taken at 88 Workshop

Activities and circulated correspondences were reviewed, discussed and a number of conclusions were reached.

1. The capability system

a) the decision to proceed with a "capability" system was affirmed
b) it was decided that the "national" system be initially predicated on the production of small grains and oilseeds (other than soybeans), the most tolerant crops, with subsequent subdivisions of class 1 to recognize the more stringent requirements of specialty crops
c) that climate, soils and landscape components be assessed separately
d) that rating be done on a continuous numeric scale
e) that factors within each major component be integrated into a single index
f) that organic soils be rated for the same crops as mineral soils

2. Climatic framework

a) that a basic seven class system be used based on the small grains and oilseeds with class 1 further divided to recognize more stringent requirements of specialty crops
b) that two main components be recognized, one for moisture and one for heat/length of season
c) that the moisture component be based on "water deficit"
d) that the heat component be based on "growing degree days", daylength and length of growing season
   - that "Corn Heat Units" be considered for subdividing class 1.
e) that some modification should be considered for spring, fall and winter factors.

3. Definition (and elaboration)

It became apparent that some definitions are required for clarification of both our objectives and the links to other related activities. The following is suggested:

Capability (for Agriculture) - an assessment which focuses on the nature and degree of limitations imposed by the environmental characteristics of a land unit for a certain use (for general arable agriculture) (modified from Smith et al 1983).

- brackets specify agricultural capability and the use as general arable agriculture
- it includes concepts of flexibility (or adaptability), productivity and sustainability
- a broad concept generally dealing with groups of crops
- regional or national in scope
- economics is excluded.

4. A suggested title for the new system is:

The system of land capability classification for agriculture in Canada:
I. Annually Cultivated Crops

5. Suitability ratings

It was generally agreed that the more detailed and locally oriented suitability assessments for specific crops were what we should be striving towards. However, given the resource constraints of the present time, it was not feasible to carry both capability and suitability. As the more general capability provides some of the framework for the detailed work, it was decided that it should take priority.

- we would keep up some minimum level of activity which was to compile and stratify a list of crops to be considered.
- it was suggested that more emphasis be placed on the exotic crops.

IV. Activities for the next year

1. Upgrade of the Land Capability System.
   - activities will be carried out on all aspects with a first draft by early 1990.

2. Soil Suitability Criteria:

   - will be confined to a review of climate categorization of crops.

3. Awareness:

   a) Workshop - proposed for July 5-7, 1989. Will attempt to finalize issues raised in A) and B).

   b) Provincial extension - Pettapiece to travel to various regions to help explain objectives, process and progress relating to the CLI upgrade.

V. Additional resource requirements

A number of directly or indirectly related activities (which involve resources outside our working group) were identified.

1. Some climatic analysis will be required in the development and testing of the climate component

2. Some cartographic assistance will be required for drafting of climate maps.

3. It would be useful to have some research conducted to evaluate all components of the system with particular emphasis on the rating of individual parameters.

4. The CanSIS files do not contain all the data required for capability interpretations and this must be addressed. Specific needs are:
   a) climate data - is present only by inference from soil taxonomy. This is inadequate for most interpretations involving capability, productivity, suitability, erosion potential, etc. A link to some kind of spatial (map) representation is required.
   b) landscape data - is limited to percent slope. Such attributes as shape of slope, length of slope and pattern also need to be considered for many interpretations.
   c) drainage data - is based to a large extent on taxonomic features. We also need to be able to record and evaluate man-made modifications such as tile drainage
      - this might be mainly a more detailed provincial requirement but allowance should be made in the file structure for this kind of data.
   d) soil structure - is available only by inference from taxonomy. Soil structure is vital for assessment of wind and water erosion as well as capability. It is also required for any water modelling, which includes productivity models. Assumptions can be made by qualified pedologists but that does not serve our user public particularly well.

VI. Additional observations

1. This working group has restricted its terms of reference to a capability focus but there are a number of other interpretations which should be considered, such as:
   a) forage crops
   b) fruit crops
   c) vegetable crops
   d) irrigation
   e) grazing
   f) management links
   g) productivity links, etc.

   - it is not suggested that this working group proceed with those in the future but only that they need to be addressed.

SOIL WATER INVESTIGATIONS - SWIG - WORKING GROUP REPORT

R.G. Eilers

SWIG working group was initially established to address the issue of soil drainage classification. The objective was to develop a more quantitative system of describing soil drainage. In meeting this objective the working group proposed a list of criteria consisting of 7 attributes. Each of these attributes was divided into class intervals with two levels of specificity to accommodate application at either a local or more general level. The criteria were subsequently published in the ECSS 1982 Manual for Describing Soils in the Field for use and evaluation by soil surveyors.

As a consequence of the compilation of this criteria, SWIG recommended to ECSS that a Methods Manual for Soil Water Investigations be prepared. In response to this recommendation, a first draft of this manual was prepared (SWIMM 1982) and circulated for review. However, due to changing circumstances and work priorities, the final revision of this manual was not completed. In the meantime, the importance of this manual has persisted and, in fact, the need to document our procedures for describing soil water regimes has continued to increase.

It is now proposed that this manual should focus on the specific attributes of soil water regime characterization as proposed by SWIG and those required in the CanSIS soil database. The manual should be compiled and edited to encompass regional and national needs.

Recommendation to ECSS

The working group of SWIG recommends to ECSS that a Methods Manual for the Classification, Description, and Measurement of Soil Water Properties, as identified by the SWIG criteria and the National Soil Data File (CanSIS), be completed by March 31, 1990.

MAP AND REPORT FORMATS WORKING GROUP REPORT

Charles Tarnocai

INTRODUCTION

This working group was formed in late 1987 to set up standard map and report formats for the ARC/Info system. The members of this working group are: Peter Brimacombe, Brian Edwards, Bruce MacDonald, Brian Monette and Charles Tarnocai.

The work of the Map and Report Formats Working Group has the following objectives:

1. To develop standard formats for soil and interpretive maps generated by ARC/Info.
2. To develop standard formats for soil survey reports.

We would like the Expert Committee on Soil Survey to review these objectives and implement the necessary changes.

The following schedule for carrying out these objectives was set on June 7, 1988:

1. The interim report containing a description of the ARC/Info standard formats and examples of these formats was to be ready by September 30, 1988.
2. This report is to be reviewed by the CANSIS Working Group and federal and provincial colleagues and correlators.
3. The CANSIS Working Group will meet and their modifications will be submitted to the Map and Reports Formats Working Group by the end of February, 1989.
4. The revised formats will be ready for implementation by March 31, 1989.

The working group completed its first report in May, 1988. In this report various standard product formats for both soil and interpretation maps were described as were the new soil report formats. This report was then presented at the CANSIS Working Group meeting in September with some preliminary standard map examples. Early this fall Peter Brimacombe completed the necessary programming for the "standard soil map with legend" format. The 1:25,000 scale Wainfleet soil map was then selectd as a test of this format. Two maps were prepared, one strictly for internal use (map version 1) and the other for external use (map version 2). Both of these maps contain the minimum data sets. A brief description of these maps is given in the following section and sample maps will be distributed during the Expert Committee on Soil Survey meeting in Winnipeg.

STANDARD SOIL MAPS

MAP VERSION 1 (FOR INTERNAL USE ONLY)

This map format contains the absolute minimum amount of data and will be restricted to internal use. The following information will be plotted on these maps:

- simple title with the scale bar
- longitudes and latitudes
- soil boundaries and polygon map unit codes
- credit note

An accompanying computer printout will contain the following information:

- soil legend
- text blocks
- map reference line types

The turnaround time for production of this map is estimated to be approximately one week, assuming:

- the map is in a final archive UTM form
- the map is linked to a SMUF file
- the SMUF file has been corrrelated with the SNF file

MAP VERSION 2 (FOR EXTERNAL USE)

This map format contains the minimum soil and cartographic information necessary for a standard ARC/Info-generated soil map. All information is printed on the map and no supplements are provided. Besides the information given on map version 1, this type of map also contains the following additional information:

- map base
- annotations (e.g., names of rivers, lakes and towns)
- legend and text blocks on the map
- key map
- UTM grid
- enhanced title

The turnaroud time for producing this map is estimated to be approximately three weeks, assuming:

- the base is digitized
- the preliminary positions of the annotations have been selected

STANDARD DERIVED AND INTERPRETIVE MAPS

These are derived and interpretive maps with standard (fixed) legends. They are produced in monochrome black and can have up to seven classes. A coloured version of these maps can also be produced, but it can display a maximum of only three classes. If requested, the scale of these maps can be reduced by a factor of two.

On both the derived and interpretive maps, the common boundaries will be removed and, on this newly created polygon map, the polygons will be renumbered or allocated a class or attribute symbol of no more than two characters. The patterns on both of these types of maps should be selected so that they reflect the ranking of the classes. A brief description of the legends of the derived and interpretive maps is given below and shown in Figures 1 and 2.

A. Derived maps

1. Computer-generated maps with fixed standard legends organized and sorted by polygon numbers (Figure 1).
   - polygon numbers
   - reference legend with attribute symbols

   e.g., drainage map legend:
   W - well drained
   I - imperfectly drained
   P - poorly drained

2. Computer-generated maps with fixed standard legends organized and sorted by attribute symbols (Figure 2).
   - attribute symbols
   - reference legend with attribute symbols

   e.g., drainage map legend:
   W - well drained
   I - imperfectly drained
   P - poorly drained

3. Computer-generated maps with patterns, no symbols.

   e.g., drainage map legend:
   == - well drained
   :: - imperfectly drained
   \\ - poorly drained

B. Interpretive maps

1. Computer-generated maps with fixed standard legends organized and sorted by polygon numbers (Figure 1).
   - polygon numbers
   - reference legend with class symbols

   e.g., capability maps:
   H - high
   M - medium
   L - low

2. Computer-generated maps with fixed standard legends organized and sorted by class symbols (Figure 2).
   - polygon numbers
   - reference legend with class symbols

   e.g., capability maps:
   H - high
   M - medium
   L - low

3. Computer-generated maps with patterns, no symbols.

   e.g., capability maps
   == - high
   :: - medium
   \\ - low

C. Reference material

1. A definition of the interpretation methodology should be included on these maps. This should be provided by the author.

2. The legend, including the symbols and classes or attributes, should be included on these maps.

3. An explanation of the algorithm, which should be supplied by the author, should be included on these maps.

Figure 1. Legend for derived and interpretive maps (sorted by polygon numbers).

Polygon number or interpretation code	Soil attribute or class

Comments:

1. Polygon number: (7 characters) sorted numerically
2. Class symbol:
   a. includes the class and subclass symbol
   b. three (colour) or seven (monochrome) classes and their % distribution can be identified on the map
   c. definitions of classes and subclasses should be given
   d. definition of symbol structure should be given
   e. map symbols should have only two characters
   f. the legend should have no more than seven classes

Figure 2. Legend for derived and interpretive maps (sorted by class or attribute symbols).

Soil attribute or class symbols	Description of Soil attribute or class

Comments:

1. Soil attribute or class symbol: (2 characters) sorted alphabetically

2. Class symbol:
   a. includes the class and subclass symbol
   b. three (colour) or seven (monochrome) classes and their % distribution can be identified on the map
   c. definitions of classes and subclasses should be given
   d. definition of symbol structure should be given
   e. map symbols should have only two characters
   f. the legend should have no more than seven classes

MAP ENHANCEMENTS

(These enhancements apply to map version 2.)

MAP WITH MAP UNIT CODES

1. Black and white line map (direct ARC/Info product)
   (Produced from map version 2)
   - standard legend
   - map unit codes
   - standard base (ARC/Info-generated)

2. Black and white line map
   (same as product 1, but with manual base)
   - standard legend
   - map unit codes
   - manually-produced base

3. Black and white map with black and white screens
   (Same as product 1 or 2, but with patterns)
   - 7 black and white screens
   - standard legend
   - map unit codes
   - digitized or manual base

4. Colour map with black and white lines and colour screens
   (Same as product 1 or 2, but with colours - similar to the traditional soil maps)
   - standard legend
   - map unit codes
   - digitized or manual base
   - colour screens

5. Colour map
   (Same as product 4, but the base is a separate colour)
   - standard legend
   - map unit codes
   - colour screens
   - colour base

6. Full manually-produced colour-separated map
   (Automated colour separation)
   - standard legend
   - map unit codes
   - colour screens
   - colour base

MAPS WITH MAP SYMBOLS

S1. Maps with computer-generated symbols
S2. Maps with typeset symbols

MAPS WITH MODIFIED LEGENDS

L1. Maps with computer-generated modified legends
L2. Maps with typeset modified legends

SUGGESTED REPORT ENHANCEMENTS

1. ARC/Info-generated report
   (No manual enhancement; printed by a laser printer)
   - map unit descriptions
   - soil descriptions

2. ARC/Info-generated report imported to a word processor or desk top publisher. Same as product 1, but with text with standard sections.

3. Report type 2 with line figures

4. Report type 3 with photographs

5. Typeset report
   Typeset version of report type 3

SOIL SURVEY RELIABILITY WORKING GROUP REPORT

The Soil Survey reliability working group has been inactive since the last ECSS meeting. Attachment of the Chairman to the NSCP and higher priority work on the CanSIS ARC/Info upgrade caused suspension of offical working group activities.

The CanSIS working group has requested that the reliability working group address the definition and criteria for attaching reliability estimates to the CanSIS soil name file and soil layer file data estimates. The working group will undertake this task upon request from the secretary or chairman of the ECSS.

FORESTRY INTERPRETATIONS WORKING GROUP REPORT

No progress has been made on the Forestry Manual since the last ECSS meeting. The attachment of the manual's editor to the NSCP caused the lack of progress on revision of the manual. The committee has not met for a number of years and the only outstanding task is the submission of the manual. The editor estimates that approximately .15 py is necessary to revise the current version for submission to final review.

RECOMMENDATIONS

EXPERT COMMITTEE ON SOIL SURVEY: 8TH MEETING

WINNIPEG, MANITOBA

14-16 NOVEMBER 1988

RESOLUTIONS, RECOMMENDATIONS AND CONCERNS

W.W. Pettapiece

Discussions in this area were stratified into R and D, Non R and D, and Concerns.

R and D

Applications development was stressed. Spatial component and the use of GIS were specifically identified.

a) Process modelling for soil monitoring and conservation was given highest priority.

   This has implications for standardizing databases and upgrading soil survey information.

b) Methodologies for upgrading old surveys are required.

R and D Recommendations

1. Spatial data and process modelling for soil conservation and monitoring

   That various groups within federal and provincial Research agencies and universities be encouraged to cooperate in developing process models and linking them to computerized spatial information to deal with regional and national problems of soil conservation, quality and management. At present such work is fragmented and unfocussed.

Non R and D

a) The principal identified need concerned the coordination and compatibility of various sources of spatial data to:

   - identify sources of data and specifications
   - estabish coordination links
   - determine the degree of compatibility of various data sources.

b) The development of standards and correlation of electronic databases.

Non R and D Recommendations

1. Compatibility of federal and provincial sources of spatial data

   That in view of the multiplicity of types and sources of spatial data related to soil information systems such as CanSIS, an interagency group should be directed to:

a) Identify federal and provincial sources of spatial data that are of potential use in combination with soil inventory data.

b) Establish liaison and, where possible, cooperation with the agencies in charge of these data types.

c) Compile specifications of what data are available.

d) Establish the degree of compatibility between soil inventory and other spatial data.

e) Report these findings and recommend further developments.

2. Reduction of soil mapping by Agriculture Canada

In view of the support for ths work by Quebec, Ontario, Manitoba, Saskatchewan and Alberta, that Agriculture Canada not reduce its commitment of resources to soil mapping.

Concerns

A number of concerns relating specifically to the inventory activity were also raised:

a) That Agriculture Canada not reduce its activity in this area (QU, ON, MN, SK, AB).

b) Extension effort by soil survey:
It is essential that soil survey, at both national and regional levels, allocate a portion of existing resources to extension activities. Maps, reports and interpretations must be explained and marketed to ensure their greater, more timely and more cost effective use.

c) 1988 CASCC Recommendations and National Soil Conservation Program:
The ECSS notes that to three recommendations of CCLRS (R&D: Multidisciplinary Research in Soil and Crop Management, Graduate Training in Soil and Water Conservation; and non R&D: Maintaining Soil Related Activities) Agriculture Canada replied by suggesting that they could be dealt with through the National Soil Conservation Program. It is now apparent that this program may not have the resources to do so. ECSS therefore suggests that the recommendations be repeated this year.

d) The Continuance of a unified Land Resource Research Centre:
The Land Resource Research Centre has been a leader and central focus for developing national standards for inventory, research, interpretation and conservation of Canada's soil resources, and has fulfilled that objective well. The ECSS considers that it is critical that the LRRC continue to fulfill this role, in that a national perspective is required to deal with nearly all land use questions. The ECSS expressed concern over rumours that the Centre might be realigned.

e) Fewer permanent staff as a result of short term funding:
The number of permanent staff engaged in land and water research throughout the country is declining, as is the level of funding. Such research is being carried on more and more through short term funding from federal/provincial agreements and with term positions. The ECSS is concerned about the long term practicality of such arrangements and requests that efforts be made to support this work with more permanent resources.

f) The Terms of Reference for ECSS should be reviewed and updated to reflect present concerns (see following discussion).

TERMS OF REFERENCE

The old Terms (1979) were circulated and the following discussions raised several points regarding the operation and obligation of the present system.

The ECSS puts the seal of approval on our pedological deliberations and recommendations. The approval from the ECSS gives us the standards which our collective pedological community is obligated to recognize. It has functioned in the past because it included representation from every agency involved in pedological work. Today this is no longer true. There is limited representation and more agencies in the field. The implication is that the ECSS representatives have an increased obligation to contact, inform and involve all the local members of the community. If this occurs then many of the fears expressed today may be addressed. Member organizations are obliged to consider recommendations from the ECSS. Issues larger than the immediate ability of organizations to respond to are identified and forwarded to CCLRS/CASCC for awareness and action.

The process is already in place, it just needs to be formalized and activated.

It was stressed that the ECSS is a mechanism for information exchange and that the members have a formal obligation to report back to the pedological community in their respective jurisdiction (provinces or agencies). It was further suggested that a new Terms of Reference should be drawn up to specifically identify member roles and responsibilities as well as the committee obligations. The following draft was presented for discussion and for action at the next meeting.

Proposed Terms of Reference - ECSS

i) To report on major pedological activities, issues and concerns in the respective jurisdictions.

ii) To prepare a summary of concerns to contribute to ECSS statements to be forwarded to CCLRS regarding issues of national or regional importance (not generally of a technical nature).

iii) In response to technical concerns, to advise on the establishment of working groups.

iv) Receive and make decisions on recommendations from working groups and advise on direction.

v) Members have an obligation and responsibility to report back to their jurisdiction on the deliberation of the ECSS including the recommendations of the Working Groups, the decisions made on behalf of their respective provinces or agencies, and to invite response from their community. This involves informing the whole pedological community.

The last point (v) is to be stressed.

APPENDICES

APPENDIX 1

November 1988

Membership List of Expert Committee for Soil Survey

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

	Regional Members	Term ends
B.C.	H.A. Luttmerding Surveys and Resource Mapping Br. B.C. Ministry of Environment 553 Superior St. Victoria, B.C. V8V 1X5 (604) 387-1146	1991
Alta.	Dr. S. Moran Alberta Research Council P.O. Box 8330 Postal Station F Edmonton, Alberta T6H 5X2 (403) 438-7507	1991
Sask.	H. Rostad (Need replacement) Saskatchewan Soil Survey John Mitchell Bldg. University of Saskatchewan Saskatoon, Sask. S7N 0W0 (306) 975-4061	1988
Man.	G.F. Mills Canada Manitoba Soil Survey Soil Science Building University of Manitoba Winnipeg, Man. R3T 2N2 (204) 474-6105	1990
Ont.	B. van den Broek Ontario Inst. of Pedology Guelph Agricultural Centre University of Guelph Box 1030 (52 Royal Road) Guelph, Ontario N1H 6N1 (519) 823-5700	1991
Que.	D. Carrier Service de la recherche en sol du MAPA 2700, rue Einstein, B-1-28 Ste-Foy, Québec G1P 3W8 (418) 643-2334	1990

		Term ends
N.B.	Dr. I. Ghanem Dept. Agriculture & Rural Development N.B. Ministry of Agriculture Box 6000 Fredericton, N.B. E3B 5H1 (506) 453-2666	1990
N.S.	Mr. Dennis Moerman Nova Scotia Dept. of Agriculture and Marketing Nova Scotia Agricultural College Truro, Nova Scotia B2N 5E3 (902) 895-1571	
P.E.I.	A.T. Raad (Need replacement) Plant and Industry Branch P.E.I. Dept. of Agriculture Box 1600 Charlottetown, P.E.I. C1A 7N3 (902) 892-5465	1987
Nfld.	J. van de Hulst (Need replacement) Dept. of Rural, Agricultural and Northern Development Provincial Agriculture Bldg. Brookfield Road, P.O. Box 4750 St. John's, Newfoundland A1C 5T7 (709) 576-3845	1988
	Departmental Representative	
Envir.	J. Thie (Need replacement) Lands Directorate Environment Canada 20th Floor Place Vincent Massey Hull, Quebec K1A 0E7 (613) 997-1246	
INA	I. Sneddon Resource Inventory Manager Land Management Division Northern Water, Lands and Forests Indian and Northern Affairs Hull, Quebec K1A 0H4 (613) 997-0663	

		Term ends
EMR.	R. Fulton Terrain Sciences Division Energy Mines and Resources 601 Booth Street Ottawa, Ontario K1A 0E8 (613) 992-7861	
P.F.R.A.	W. Harron P.F.R.A. Motherwell Building 1901 Victoria Ave., Regina, Saskatchewan S4P 0R5 (306) 780-5155	
C.F.S.	B.D. Haddon Canadian Forestry Service Place Vincent Massey 351 St. Joseph Blvd. Hull, Quebec K1A 1G5 (613) 997-1107	
Chairman	Dr. E.E. Mackintosh Ecological Services for Planning Ltd., 530 Willow Road Guelph, Ontario N1H 7G4 (519) 836-6050	1990
Secretary	K.W.G. Valentine Land Resource Research Centre Agriculture Canada Central Experimental Farm Ottawa, Ontario K1A 0C6 (613) 995-5011	1988

APPENDIX 2:

1988 ECSS Attendance List

ALBERTA		
Gerald Coen	LRRC	Edmonton
Bob Howitt	Alberta Research Council	Edmonton
Stephen Moran	" " "	Edmonton
Wayne Pettapiece	LRRC	Edmonton
Bruce Walker	LRRC	Edmonton
BRITISH COLUMBIA		
Alex Green	LRRC	Vancouver
Herb Luttmerding	B.C. Ministry of Environment	Victoria
Hans Schrier	University of B.C.	Vancouver
MANITOBA		
Bob Eilers	LRRC	Winnipeg
Wally Fraser	LRRC	Winnipeg
Walter Michalyna	LRRC	Winnipeg
Gordon Mills	Manitoba Dept. of Agriculture	Winnipeg
Geza Racz	LRRC	Winnipeg
Bob Smith	LRRC	Winnipeg
Hugo Veldhuis	LRRC	Winnipeg
NEW BRUNSWICK		
John MacMillan	N.B. Dept. of Agriculture	Fredericton
Herb Rees	LRRC	Fredericton
NEWFOUNDLAND		
Jan van de Hulst	RAND	St. John's
Ed Woodrow	LRRC	St. John's West
NOVA SCOTIA		
Ken Webb	LRRC	Truro
ONTARIO		
Cliff Acton	LRRC	Guelph
Trevor Dickinson	Trent University	Peterborough
Brian Edwards	LRRC	Ottawa
Brian Haddon	Cdn. Forestry Service	Chalk River
Bruce MacDonald	LRRC	Ottawa
Erwin Mackintosh	Ecological Services Ltd.	Guelph
John Nowland	LRRC	Ottawa
Jack Shields	LRRC	Ottawa
Charles Tarnocai	LRRC	Ottawa
Keith Valentine	LRRC	Ottawa
Bob van den Broek	Ont. Min. of Agr. and Food	Guelph

1988 ECSS Attendance List (Continued)

PRINCE EDWARD ISLAND		
Conrad Veer	LRRC	Charlottetown
QUEBEC		
Dominique Carrier	Service de la recherche en sol du MAPA	Ste. Foy
Jean-Marc Cossette	LRRC	Ste. Foy
SASKATCHEWAN		
Don Acton	LRRC	Saskatoon
Darrin Anderson	Sask. Inst. of Pedology	Saskatoon
Bill Harron	PFRA	Regina
YUKON		
Scott Smith	Canada Yukon Soil Survey	Whitehorse

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