Expert Committee
on Soil Survey

Proceedings of the Seventh Meeting

Ottawa, Ontario
20-21 October 1986

Canada

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Ottawa, Ontario

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

Research Branch
Agriculture Canada
1989

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PROVINCIAL REPORTS

EXPERT COMMITTEE ON SOIL SURVEY: 7TH MEETING

OTTAWA, ONTARIO

20-21ST OCTOBER 1986

NEWFOUNDLAND REPORT TO ECSS, OCTOBER 1986

J. van de Hulst

This report briefly outlines the activities and concerns regarding soil survey of the Newfoundland Soil Survey group, and the requirements needed to optimize the role of soil survey in land planning and management in the province of Newfoundland.

PRESENT SOIL SURVEY ACTIVITIES

The following Newfoundland soil survey reports were printed and published by the Research Branch of Agriculture Canada:

Soils of the Port au Port Peninsula, 1:50,000
(Greenlee and Heringa)

Soils of the Cormack-Deer Lake area, 1:50,000
(Button)

Soils of the Botwood-Wesleyville area, 1:250,000
(Sudom and van de Hulst)

In addition the following Newfoundland soil survey reports are in preparation for publication by the Research Branch of Agriculture Canada:

Soils of the Gander Lake area, 1:250,000
(F. Hender)

Soils of the Red Indian Lake-Burgeo area, 1:250,000
(E. Woodrow)

Soils of the Stephenville-Port aux Basques area, 1:250,000
(F. Hender)

Soils of the Bonavista Peninsula, 1:50,000
(P.K. Heringa and E.W. Woodrow)

Soils of the Green Bay area, 1:50,000
(F. Hender)

Soils of the Grandys Lake-Little Friars Cove area, 1:50,000
(E. Woodrow)

Soils of the Flat Bay area, 1:50,000
(F. Hender)

Soils of the Terra Nova development area, 1:25,000
(F. Hender)

Soils of the Pasadena-Deer Lake area, 1:25,000
(G. Kirby)

Soils of the Comfort Cove Peninsula, 1:25,000
(J. van de Hulst)

Soils of the Markland area, 1:12,500
(R. Ricketts)

Newfoundland Soil survey is pleased with this service offered by LRRC and recommends that this continues; concern is expressed about the problems and delays that are being caused by the change in pricing policy of the map printing.

A number of soil survey projects are in progress. Field work was finalized during the 1985 field season and report writing is in progress for the following reports:

Soils of the Sunnyside area, 1:50,000
(E. Woodrow)

Soils of the Sandy Lake-Bay of Islands area, 1:250,000
(G. Kirby)

Soils of the Belleoram-St. Lawrence area, 1:250,000
(J. van de Hulst)

Soils of the St. Fintans area, 1:50,000
(R.J. Whalen)

Soils of the Flat Bay-Main Gut area, 1:25,000
(R. Ricketts, J. Whalen)

Soils of the Bay of Exploits area, 1:25,000
(J. van de Hulst)

Soils of the Fischells area, 1:12,500
(R. Ricketts, J. Whalen)

It is recommended that most of these reports be accepted by LRRC for editing and publication.

During the 1986 field season the provincial soil survey unit undertook the detailed soils survey of the St. John's Agricultural Development Area. The purpose of the survey is to assess the soils for forage production in order to re-evaluate the inclusion or exclusion of lands within the agricultural zone. The area covers approximately 17,500 ha. This project was the first single purpose survey in Newfoundland using computer data processing. Approximate rate of progress was 420 ha/day with three survey teams, resulting in approximately 2 months fieldwork. It should be noted that the area was highly accessible. d-Base III-plus software package was used to set up a polygon file for this survey. Developing the polygon file for this survey took some time due to the lack of expertise in computer programming. It is recommended that LRRC looks into the possibility of developing software packages for soil survey.

During the 1986 field season, the federal soil survey unit started the soil survey of the Musgravetown-Lethbridge area, 1:25,000 covering approximately 20,000 ha. Only preliminary work was performed due to other commitments. Additionally the Northern Peninsula was surveyed at a

1:1000,000 scale. This completed the soil-landscape map for the island portion of the province of Newfoundland (phase 1), which was started during the winter of 1984/85.

OTHER ACTIVITIES

Soil-names file for Newfoundland has been reorganized by the Newfoundland soil survey group during the winter of 1985/86. A publication "Soil Names of Newfoundland" has been prepared. The file will be entered onto the IBM-PC. Newfoundland Soil Survey wishes to express its pleasure with the acquisition of the IBM-PC by LRRC. Additionally, Newfoundland Soil Survey wishes to thank Gary Patterson from LRRC, Truro, for setting up the system and providing advice. At the moment, limited use is made of the system due to lack of expertise. Newfoundland Soil survey is pleased with the commitment of LRRC to provide 1/4 p.y. for a computer technician with LRRC, St. John's West.

Lack of climatic data of inland regions for the island of Newfoundland restricts classification of soil climate. The highest level of stratification in soil mapping in Newfoundland is the pedoclimatic zonation. A preliminary report on pedoclimatic zones has been drafted, and editing is underway. To properly characterize pedoclimatic zones more information is needed. The provincial soil survey unit has 6 thermographs located in 5 regions across the island with data recorded over 4 to 6 years to evaluate regional growing degree day accumulation and frost occurrence. A larger and more diverse network is needed to evaluate regional climatic differences for farm weather forecasting and to assess soil suitability for agricultural production. It is recommended that LRRC looks into the possibility of providing expertise and equipment to expand the collection of climatic data.

Soil capability ratings for special crops of mineral soils have been drafted by J. van de Hulst. These ratings will be tested on agricultural fertility trial plots by E. Woodrow and J. van de Hulst. Additionally E. Woodrow has been testing a system for land capability rating of organic soils by M.P. Lévesque and S.P. Mathur. Different capability ratings for organic and mineral soils are devised in all provinces by government agencies and by universities. It is recommended that ECSS continues and possibly expands its working group on organic interpretations to facilitate exchange of information and ideas.

FUTURE SOIL SURVEY ACTIVITIES

Under the 1979/83 DREE Agreement, Newfoundland Soil Survey experienced a rapid growth. Many soil survey projects were undertaken in response to specific needs of the DREE program. After 3 years there are still many projects to complete. A 5 year program outline was drafted in 1985 to work away the backlog in soil survey projects. For 1986/87, three detailed soil survey projects will be finalized. These are Reidville, Whites River Road and extension and Goose Arm Road, collectively occupying approximately 4,000 ha. For 1987/88, four detailed soil survey projects are scheduled to be finalized: the projects for Sandy Brook, Bay d'Espoir, Wooddale and Winterland, with a total area of approximately 20,000 ha.

The Musgravetown-Lethbridge soil survey project, (approximately 20,000

ha) started by the Federal Soil Survey unit, will become a cooperative soil survey project between Federal and Provincial soil survey units. A total of 4 soil survey teams are scheduled to survey the area during the 1987 field season.

Phase 2 of the generalized soil-landscape mapping will start during the 1987 field season. The southern portion of Labrador is scheduled to be mapped at a 1:1,000,000 scale. It is expected that little field work is needed since much of the information is already available.

OTHER FUTURE ACTIVITIES

A start has been made at 'cleaning up' the soil data file for Newfoundland. This process will continue.

Hopefully, Newfoundland can start the transition from CanSIS to Arc-Info with a set of clean files. It is recommended that the CanSIS/Computer Working group will have their recommendations available as soon as possible.

Over the years many soils have been identified and analysed. Much chemical information is available, but soil physical information is scanty. Newfoundland soil survey has been collecting data on bulk density; some data has been collected on watertable fluctuations and depth of frost occurrence; E. Woodrow is involved in soil seepage trials by Dr. B. Roberts from Forestry Research Center, Agriculture Canada. However, more and better organized data collection is needed. It is recommended that LRRC provide scientific and technical support and possibly seasonal manpower to set up soil monitoring sites and a system of soil physical data collection.

Agricultural capability ratings for organic soils have been used and tested in Newfoundland over a number of years, while the agricultural research station, St. John's West, has been testing different crops on organic soils. It is recommended the LRRC provide the initiative to combine the two research projects and develop an organic soil rating system for special crops for Newfoundland.

CONCERNS

Organized soil survey has been going on in Newfoundland since the early 1960's. Close to 20% of the island of Newfoundland has been covered by soil surveys. However, little soil research has been conducted, and questions about soil characterization and interpretation continue to plague soil survey. Lack of manpower at LRRC-St. John's West, the loss of the agronomist position at the Agricultural Research Station and the lack of soil research at the Memorial University of Newfoundland will perpetuate this problem.

Related to the foregoing concern is the lack of adequate information on soil degradation. Shallow soils, high rainfall, low organic matter content of soils and poor soil structure are characteristic to Newfoundland. These characteristics indicate a high potential for soil degradation. Soil degradation in Newfoundland has to be identified and researched. e.g. Newfoundland has no soil erosion trial plot. It is recommended that LRRC provides the resources, possibly in conjunction with the Agricultural Research Station, to set up soil erosion trials in Newfoundland.

PRINCE EDWARD ISLAND REPORT TO ECSS, OCTOBER 1986

Awni T. Raad

The soil survey work in Prince Edward Island has been invested in support of existing soil and water conservation programs which are implemented jointly between Agriculture Canada and P.E.I. under the ERDA Agreement. Under this program, approximately 600,000 feet of tile drainage were installed on the Island last year, improving crop production potentials on farms and supporting two local farm drainage firms. Although there have been a number of runoff and erosion control projects implemented, the major interest was in land drainage.

P.E.I. soil survey information was also used to design and monitor three irrigation projects on potato farms. Soil moisture regimes were monitored in one project, while yields were measured in the case of the other two projects.

Site surveys were conducted to assist a total of 56 producers in developing drainage and soil conservation plans.

A major breakthrough in P.E.I. was achieved this year in the area of soil erosion work when funds were made available under the Technology Development Program of the ERDA Agreement to monitor factors which influence soil erosion and the extent of sedimentation in streams as a result of soil erosion within a specific watershed area. Furthermore, the Province has issued an Executive Council appointment of a Provincial Committee to develop a provincial strategy for resources conservation with the main emphasis to be placed on soil and water conservation. Representation on this Committee was secured from all concerned line departments and interested citizen groups including Agriculture, Fisheries, Forestry, Environment, and Community Planning as well as the Land Use Commission.

The writer of this report has been appointed to represent the Department of Agriculture on this Committee which is hoped to complement and add additional thrust to the existing efforts of soil and water conservation in P.E.I.

At the regional level, P.E.I., together with representatives of Nova Scotia, New Brunswick and Newfoundland are working towards developing a land use publication to be published under the auspices of the Atlantic Provinces Agricultural Services Coordinating Committee. The writer of this report serves as the Chairman of this group and a major emphasis of this publication is expected to be placed on increasing the level of awareness of the general public in the value of soil information and its application in everyday life.

There is definitely an increased awareness of conserving soil and water resources in the Province by many factions of society. This is exemplified by the interest and the decision made by the Summerside Chamber of Commerce to conduct, on November 20th coming, a seminar to discuss the impact of soil conservation on the business community in the Summerside and surrounding communities. It seems in order to mention that our Provincial Soil Specialist, the Soil Surveyor from Agriculture Canada, and other research people are very much part of this important grassroots activity.

NOVA SCOTIA REPORT TO ECSS, OCTOBER 1986

D. Holmstrom

This report describes briefly the progress in Nova Scotia since our last Expert Committee meeting in 1984. In addition, the concerns and recommendations regarding future work are summarized.

Progress

In the past two years, Nova Scotia soil survey has worked on two major projects: the Agri-Food Development Agreement (AFDA) contract surveys and the Land Evaluation and Planning Service (LEAPS) farm surveys.

AFDA SOIL SURVEY CONTRACTS

Initiated in 1984, the AFDA contract surveys have completed the third year of a four year contract. They were designed to cover 276,000 ha of land in the three major agricultural areas of the province. These SIL 2 surveys are carried out by consultants at a scale of 1:20,000. Quality control is provided by federal soil survey personnel.

The experience gained by federal soil survey's involvement with contract surveys has resulted in the development of procedures and recommendations for future contracts. A report on this entitled "Contract Surveys: the Nova Scotia Experience" is now in preparation. Some of the major recommendations contained in the report are:

a) Developmental work in soil survey procedures should not be combined with standard operational procedures in soil survey contracts. Developmental work should be addressed as a separate contract or undertaken by government research departments.

b) Determine interpretations required, the soil and land parameters and their classes necessary to do the interpretations.

c) Government personnel should develop the mapping legend. They should not only rely on previous surveys but should plan on developing and testing the legend in the field. This would require sufficient lead time before a contract, using a prepared legend, is let.

d) Develop criteria and procedures to check the quality and accuracy of the deliverables of the contract survey (particularly the maps and lab analysis). Specify the criteria in the contract as well as tolerable limits. Link payment of contract to a schedule of approved specific checks monitored routinely throughout the length of the contract.

e) Allow adequate time for reviewing proposals and checking references. Also, contact experienced personnel in government agencies for their opinion regarding specific parts of the proposal.

f) If providing contractors with any material (i.e. computer software) not specifically indicated in the contract, make sure that it is documented that government personnel are providing the material, and more importantly

are not responsible for maintenance, training or support services related to the material's use.

g) Do not interfere with the operation of the contractor. Offering to assist results in government personnel doing the work that is the responsibility of the contractor. If problems arise government personnel can be held responsible.

h) Limit contracts to less than two years. This will allow review and modification of procedures (i.e. incorporation of new lab procedures which were still in the testing stage when the contract was written) for new contracts as opposed to contract amendments which require lengthy negotiations and extensive paper work.

LEAPS FARM SURVEYS

LEAPS was initiated in 1985. Its prime objective is to obtain soil and related resource information on an individual farm basis for long and short term soil management and crop production planning.

The program involves data collection on soils (scale 1:5000), previous soil management, cropping history, land improvements, climatic characteristics, etc. This data is used for making interpretations on soil suitability for specific crops, land improvements recommendations, soil management recommendations, cropping recommendations, and soil and water conservation recommendations.

Another aspect of the program is the long term record system. This information will be used for designing and monitoring crop rotation systems and other management systems. In addition, soil conservation programs will be developed to safeguard soil productivity.

In the 1985 pilot, 8 farms were surveyed covering approximately 1300 ha. In 1986, the first year where farmers were charged a fee for the program, 11 farms were surveyed covering approximately 2500 ha. When fully operational, it is estimated that 15 farms covering 3000 ha can be surveyed each year.

OTHER

The following accomplishments have been achieved since 1984:

1. Completed survey of Nappan Experimental Farm, SIL1, 250 ha.

2. Completed survey and report of Kentville Research Station and Sheffield Farm, SIL1, 261 ha.

3. Initiated cooperative study on soil moisture modeling.

4. Completed the Pictou County Report, SIL3, 276,000 ha.

5. Continued and expanded soil temperature and moisture monitoring.

6. Established a full time provincial soil survey lab.

RECOMMENDATIONS

The following are the provincial concerns in regards to soil survey. They are in order of priority.

1. The provincial soil survey unit has implemented a farm survey program (LEAPS- Land Evaluation and Planning Service). It is recommended that LRRC make a long term commitment of resources and personnel to support research in the interpretative phase of this program.

2. Classification of soil structure and its relationship to bulk density, porosity and hydraulic conductivity has been initiated by LRRC. It is recommended that LRRC continue this research and refine the classes for Maritime soils.

3. Drainage classification criteria and the effect of impermeable subsoils on yield continue to be a problem in Nova Scotia. It is recommended that LRRC increase their effort and research in these areas.

4. The AFDA soil information will be interpreted for specific crop suitabilities. These interpretations will require testing and correlation to crop yields. Productivity information for major soil types should be collected. Work on soil-crop and their cost on yields should be documented in order that interpretation guidelines may be refined. It is recommended that LRRC initiate this research.

5. The Nova Scotia Department of Agriculture and Marketing is promoting cereal grain production. Conversion from the present forage system to grain production could increase soil and water degradation. It is recommended that LRRC assist the province in developing a strategy for minimizing soil and water degradation.

6. The Eastern Correlator position of LRRC has been filled. Increased correlation of soils in the province as well as in the region will be welcomed. Soil correlation, involving provincial and federal staff, is recommended on an annual basis.

7. The Colchester County Report must be published as soon as possible.

8. The Nova Scotia Soils Institute will have in place by the end of 1986 a long term strategy for drainage. It is recommended that LRRC assist where possible the research effort directed to this problem.

9. The acquisition of computer hardware by the federal soil survey unit in Truro is supported. Continued cooperation in regards to hardware acquisition and software development is recommended.

10. Pictou County and Kentville Research Station/Sheffield Research Farm Soil Surveys were completed in 1984 and 1985. It is recommended that LRRC publish these reports as soon as possible.

NEW BRUNSWICK REPORT TO ECSS, OCTOBER 1986

H.W. Rees

This report briefly summarizes soil inventory and related land use issues in New Brunswick. Soil is recognized as one of the Province's most valuable natural resources. Land use systems must be developed that are not only economically viable, but that also ensure that the long term productivity of the land base (soil and water) is maintained or improved. Soil inventory and soil research are considered as integral components of this strategy.

PROVINCIAL CONCERNS AND ISSUES

(1) Soil Inventory

New Brunswick now has complete coverage at the reconnaissance-exploratory level (scale 1:500,000 to 1:250,000). This data base has allowed for the completion of a Generalized Soil Landscape Map (GSLM) of New Brunswick at a scale of 1:1 M. However, the need still exists for accurate, more detailed soils information in developed areas - especially detailed inventories of key agricultural areas. Implementation of agricultural policies and programs on land development and conservation require a more detailed data base. Presently, less than one quarter of New Brunswick's agricultural land base has been inventoried in sufficient detail to meet these needs. Ongoing efforts to satisfy these needs include:

i) Priorization of regions has been completed and work is being conducted in the Woodstock-Florenceville area. This is the southern half of New Brunswick's potato belt. Prior to this the only source of information for the area was an outdated (1930-40's), reconnaissance (1:63,360) soil survey map.

ii) On-farm soil survey program to satisfy needs at the individual farm level. The New Brunswick Department of Agriculture has an operational on-farm soil survey program. Detailed soils information (1:5,000) is provided as a basis for soil management and crop production planning. To date approximately 55 farms have been completed.

Progress on the soil survey program is affected by the limited number of staff involved and the fact that these same people are also called upon to contribute to other programs. It is imperative that support for both of the aforementioned soil survey programs continue. Expansion of effort is highly desirable.

(2) Computer Applications

For the purpose of this discussion, computer application will be subdivided into two components.

i) Operational Soil Data Management. The methods presently employed by both the private and the public sector to gather, analyze and present soils data are slow and inefficient. Automation of procedures from

the initial field collection stage through to the digitization of the maps are required if the computer is to be used as an operational tool to enhance soil survey production.

ii) Soil/Land Information System. If soil information is not made available in a format that the user can take advantage of, then it will go virtually without use. There is a growing need to have all soils information in an electronic format to improve accessibility and ensure that it can be integrated into the land management decisions making process. Information accessibility is a critical limitation to implementation of land development and conservation programs and policies. Soils information is only one element. Information on climate, land use, property ownership, etc. must also be incorporated. Efforts are presently underway to acquire an in-house provincial soils/land information system.

(3) Soil Degradation

Soil degradation is a serious threat to agricultural production in New Brunswick. Estimates of annual losses of yield and crop quality due to soil erosion by water, soil compaction and soil acidification exceed $20-M. On the basis of unit area costs, New Brunswick's potato belt has the highest losses of any region in eastern Canada for water erosion and compaction. An extensive research program is required to quantify the benefits, in terms of soil physical and chemical properties, crop yields and economics, of the various land management practices and controls that minimize soil deterioration. In order to assess changes in soil quality over time, a series of benchmark sites should also be established to monitor the rates of degradation under the different agricultural cropping systems utilized in New Brunswick. National guidelines should be developed which identify the parameters to be monitored and procedures to monitor them.

(4) Agronomic Interpretations

The true value of soil survey data is only realized after it is brought into use, i.e., after it has been interpreted. In fact, to a majority of users within the Province, this is the only product that is wanted. With soil survey now into production of detailed resurvey of agricultural areas and on-farm survey, pedologists are being called upon to make an array of agronomic interpretations ranging from specific crop suitability ratings to soil management and land development and conservation limitations. Existing guidelines are subjective and untested. Research is required to identify soil-climate-crop productivity relationships. Productivity information must be collected for the major soil types in the different climatic zones. A first step in this procedure should be to correlate existing crop productivity records with soil and climate data. All agronomic interpretations should be quantitative in character and/or expressed in terms of costs. It is recommended that the ECSS Agronomic Interpretation Working Group be fully supported and encouraged to expand its efforts into the development of national guidelines.

(5) ERDA - Canada-New Brunswick Agri-Food Subsidiary Agreement 1984-89

As a result of ERDA funding, significant advances are being made in soil inventory and soils research. Major thrusts include:

i) expanded soil inventory activities in Westmorland County

ii) increased efforts into the assessment and amelioration of dense compact subsoils

iii) evaluation of the efficacy of conventional subsurface tile drainage systems

iv) management techniques to rejuvenate eroded lands.

The ERDA Agreement has provided an impetus to land resource technology development. Continuity of efforts into land resource research and related activities should be included in future federal-provincial agricultural agreements.

(6) Forestry

Wood supply analysis in New Brunswick indicates a shortage in 20 years time. Forest management activities in the Province are focussed on ways to optimize current standing volume, as well as minimizing the effects of the predicted shortfall. Forest site classification is seen as one of the tools that can be used to accomplish these objectives. Reliable soils information, preferably down to the stand level, is crucial.

Unfortunately, most of the forested area of the Province is mapped only at the reconnaissance level. Detailed soils mapping is required, particularly in the northern half of the Province. This includes identification of an optimum or best scale of mapping and establishment of survey procedures and techniques specific to forestry needs.

(7) Soil Correlation

New Brunswick applauds the appointment of Mr. Charles Tarnocai as Atlantic Soils Correlator. Upgraded correlation procedures on a regional basis are essential to provide standardization and quality control and to ensure interprovincial compatibility of collected and interpreted data.

(8) ECSS Working Group Activities

Over the years, the ECSS has developed into a role model for committee organization and structure through its use of working groups to address priority issues. These working groups called upon expertise from both federal and provincial governments, universities and the private sector. In all, this tended to provide a more complete analysis of the situation. It also acted as a national forum for exchange of information. Working group meetings have not been held since 1984. As a result, progress has been hampered. It is therefore recommended that the ECSS ask the Canada Committee for Land Resource Services to provide funding to support working group activities.

QUEBEC REPORT TO ECSS, OCTOBER 1986

Dominique Carrier

Au Québec, les besoins de recherches dans le domaine de la pédologie sont: la classification et la cartographie des sols minéraux et organiques; 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 recherches retenues par la Commission des Sols sont résumées dans la brochure du CPVQ intitulée: "Besoins de recherches 1985-1987". Productions végétales, Agrométéorologie, Génie rural, Sol". Les activités de recherches des trois organismes oeuvrant dans le domaine de la pédologie demeurent cependant étroitement liées à la réalisation de la première priorité: la classification et la cartographie des sols.

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

A. Classification et cartographie des sols.

Les équipes pédologiques du Service de recherche en sols du MAPAQ effectuent des travaux de classification et de cartographie en vue de compléter la carte des sols à l'échelle 1:50 000e pour l'ensemble des régions agricoles du Québec. A cet effet, les levés pédologiques réalisés en 1986 ont permis de compléter la carte des sols du comté de Beauce et d'avancer celle du comté de Frontenac dont l'échéancier est prévu pour 1987.

L'étude des sols défrichés de la région de l'Abitibi-Témiscamingue a aussi progressé. La légende des sols de cette région a été établie par les pédologues du Service et depuis le printemps 1985, quatre équipes embauchées en vertu d'un programme spécial procèdent aux levés pédologiques pour la réalisation d'une carte à l'échelle du 1:20 000e. Cette étude, comme l'ensemble de nos travaux, vise à fournir principalement des données concrètes pour fins d'utilisation agricole.

B. Project spécial

Etroitement reliée à leurs travaux cartographiques, les pédologues de cet organisme poursuivent depuis quelques années, une étude des sols dérivés de till dans les Appalaches. Sur ce type de dépôt important en étendue les ensembles de sols ou caténas ont été définis, différenciés et séparés surtout à partir de caractères morphologiques qui ne semblent pas toujours reliés à des propriétés physico-chimiques particulières. C'est pourquoi, plus de 500 échantillons prélevés au niveau de l'horizon (roche-mère du sol) ont été anlysés au point de vue physique, chimique, minéralogique et pétrographique. Le traitement statistique de ces données, effectué au cours de l'automne va permettre de définir les différents ensembles physico-chimiques en cause, élément essentiel pour la régie et la fertilité du sol.

2. Equipes de l'Université

A. Classification et cartographie des sols

Le département des sols de la Faculté des Sciences de l'Agriculture et

de l'Alimentation de l'Université Laval a obtenu un contrat de 558,500$ d'Agriculture Canada pour la réalisation d'une étude pédologique. Cette dernière effectuée à l'échelle 1:20 000e couvre une superficie de 55 000 hectares de sols agricoles dans 23 paroisses du comté de Rimouski. Trois équipes ont débuté en join 1986 et devraient compléter ce travail pour avril 1988. L'expérience de membres des équipes pédologiques du MAPAQ et d'Agriculture Canada a été mise à profit dans le cadre de la réalisation de ce travail, afin d'assurer la continuité et la complémentarité de l'étude en cours avec celles existantes.

B. Projets spéciaux

1. Une étude sur les sols organiques dans le secteur St-Rémi/Napierville initiée en 1986, vise à mettre en relation la classification des sols organiques, leur productivité et les coûts associés à leur affaissement (étude réalisée en collaboration avec un pédologue de l'équipe pédologique d'Agriculture Canada).

2. Influence morpho-génétique des dépôts superficiels sur le développement des sols gleysoliques argileux dans la plaine de Montréal; l'aspect comportement de la nappe phréatique est un point important dans ce travail.

3. Variabilité des caractéristiques des sols de l'Anse dans leur aire de distribution à l'intérieur de la bande longeant le Saint-Laurent entre Bic et Montmagny (en collaboration avec Agriculture Canada).

4. Relations matière minérale - matière organique dans les mécanismes d'agrégation et de dispersion des particules.

3. Equipes fédérales

A. Classification et cartographie des sols

Les activités de cartographie dans la plaine du Saint-Laurent touchent à comtés. Dans Chambly, la prospection et l'échantillonnage sont complétés. Dans Rouville, 20% du territoire a été cartographié en détail cette année. Pour ce comté, une carte d'association de sols au 1:50 000e et un rapport ont été complétés à partir des informations recueillies lors du levé de reconnaissance de 1984-85. Les rapports de Richelieu et Verchères sont complétés à 80%.

Il est important de souligner qu'une réduction de 20% du budget d'opération rend difficile la réalisation des plans de travail. Le personnel de cette équipe a également diminué une seconde fois depuis 1983 à la suite du départ d'un technicien de laboratoire.

B. Projets spéciaux

1. Etude visant à évaluer la fiabilité de la carte dans le comté de Verchères.

2. Développement du traitement informatisé des données pédologiques.

C. Divers

1. Trois pédologues de l'équipe participent à des comités du CPVQ sur l'interprétation agronomique des sols.

2. Un article scientifique portant sur la classification des sols par analyse en composantes principales a été soumis à un journal de même qu'une note portant sur une technique rapide d'analyse granulométrique.

ONTARIO REPORT TO ECSS, OCTOBER 1986

B. van den Broek

In 1985 a new five year O.I.P. agreement was signed between Agriculture Canada, the Ontario Ministry of Agriculture and Food and the University of Guelph. As part of this five year agreement a detailed inventory workplan was drafted. This (five year) workplan aimed for the completion of the Regional Municipality of Niagara, Brant county, Middlesex county, Elgin county, as well as starting with the remapping of Kent county (and possibly the Regional Municipality of Durham). Once all these projects have been completed, Ontario will have a soil information base at a scale of 1:63,360 or better. To achieve this goal we will require ALL available staff (federal as well as provincial).

The O.I.P. continued to develop its computer operations, both in terms of data handling and analysis as well as the GIS system. More and more attention is being paid to soil correlation. In order to be able to make standardized soil interpretations for the whole province we have to standardize our data base. We welcomed this years visit of the national correlator after so many years done without.

Significant progress has been made in the field of soil interpretations. With the concern for soil erosion in southern Ontario, a significant part of our research efforts was (and still is) directed towards soil erosion research (i.e. the mechanisms contributing to soil erosion as well as the soil management aspects to combat soil erosion). In the past two years, new interpretation systems have been developed for specialty crops (i.e. tender fruits and grapes). These interpretations are now widely used by the planners in the Niagara Region to draft their official land use plans. The monitoring of watertables as well as soil temperature plots throughout the Niagara and Haldimand-Norfolk areas provides valuable information as far as the watertable regimes in these areas.

The forest soil and site programs in the Institute continued in both northern and southern Ontario. The northern work included participation in soil-silviculture workshops, contributing to the development of specifications for detailed forest soil inventories on more prime lands, assisting with soil and ecological classification field course and consulting on various site classification and forest growth and yield studies. In southern Ontario the Institute's contract with the Ministry of Natural Resources work was continued for a 6th year, working on soil-site productivity and silvicultural studies for softwood plantations and hardwood forests in conjunction with a range of extension activities.

PROVINCIAL CONCERNS

1. Staffing

As mentioned earlier, the O.I.P. has embarked on a very ambitious five year inventory program (1985-1990). We anticipate that by 1990 almost all of southern Ontario will have a soil data base at a scale of 1:63,360 or better. To meet this goal we require ALL available manpower (provincial as well as federal) to be committed towards this program. The concern is that

with the new SWEEP program and the involvement of the federal survey staff in this program, it will be very difficult (if not impossible) to meet this goal that we have set for ourselves. We would like to urge Agriculture Canada to secure the necessary funds and man-years to compensate the O.I.P. for those man-years that are spent by the regular survey staff on the SWEEP program.

2. Map printing

The O.I.P. is deeply concerned about the current developments with respect to the map printing program. We are particularly concerned as to what impact this reduced printing capability may have on our five year program. We anticipate that within the time frame of the next two years, we will have about 17 maps (14 new maps and about 3 reprints) ready to go to print for southern Ontario alone. We recognize that the L.R.R.C. is as much a victim of the circumstances as are the provinces. We support the L.R.R.C. in all its efforts to secure more funding to maintain the excellent service we have received in the past.

3. ARC/INFO system

We welcome the recent purchase of the ARC/INFO system by the L.R.R.C. to replace the current CanSIS system. There will be lots of volunteers to test the new system with all kinds of projects. Our fears are that within no time the system will be overloaded resulting in a reduced output. We would encourage the L.R.R.C. to review their policies and priorities not only with respect to its computer operations but also with respect to its map printing program. As far as the computer operations are concerned we would like to urge the L.R.R.C. to capitalize on what is available already (in terms of equipment and programs) in the individual provinces and take on the support role where applicable (complement the provincial potentials).

4. Land use planning

Over the past years, the O.I.P. has managed to build up a significant data bank for the soils of southern Ontario. With the serious conflicts between agriculture and urban sprawl, land use planning is still very important. In the past, the University of Guelph has gained a wealth of expertise in land use evaluation modelling. However in the last few years funding for this program has been cut off. We would like to see Agriculture Canada seek the necessary funds to put this expertise to practice for the benefit of local and regional land use planning in Ontario. Our newly acquired data base could then be put to a very good use in Ontario.

MANITOBA REPORT TO ECSS, OCTOBER 1986

G.F. Mills

This report summarizes progress by the Canada-Manitoba Soil Survey during the current year, presents concerns regarding the soil inventory and land evaluation program in the Province, and outlines suggestions and plans for future work.

1. PROGRESS

1.1 Soil Inventory

Resurvey of approximately 350 sq. miles at 1:20,000 and 50 sq. miles at 1:50,000 was completed during the 1986 field season. In addition, ground truthing was completed for approximately 70 percent (1,000 sq. miles of initial soil survey) of the Duck Mountain Forest Reserve. This initial SIL 4 inventory is to be published at a 1:125,000 scale. These surveys met requests by the Provincial Departments of Agriculture, Municipal Affairs and Natural Resources. Very detailed (SIL 1) surveys and soil characterization studies were completed for several research plots for monitoring the Long Range Transport of Air Pollutants for the Provincial Environment Department. Reports were published for 3 soil survey projects and completed to publication stage for 4 additional areas.

1.2 Interpretation

Two generalized maps (1:2,000,000) of the Province showing soil and bedrock sensitivity to acidification and potential to neutralize the acidity of incoming acidic deposition were published in cooperation with the Provincial Environment Department.

Edits to the Generalized Soil Landscape Map of Manitoba and extended legend were finalized. Final drafts of maps portraying the potential risk for soil erosion due to water and wind were completed. A draft of the Salinity Map of Manitoba (southern portion) is finalized but requires additional correlation with Saskatchewan and Alberta.

1.3 Soil Data Base for Manitoba

A Federal-Provincial Economic Regional Development Agreement (ERDA) has been initiated to compile a soil data base to support land degradation studies. In addition the ERDA project will initiate development of a comprehensive digitized data base for Manitoba soils. This data base and a delivery system to mobilize available soil data and related land base data is urgently required for all kinds of land evaluation. Although considerable new funding is available through the ERDA project, a substantial commitment from soil survey staff is required to direct and coordinate the compilation of relevant soil properties and devlopment of the data base.

2. PROVINCIAL CONCERNS

2.1 Federal-Provincial Cost-Sharing of Printing Soil Survey Maps and Reports for Manitoba

The decision by Surveys and Mapping Branch of EMR to raise the prices charged to LRRC of Agriculture Canada for printing soil survey maps for the Provinces may result in significant delays in publishing completed soil surveys. Manitoba has taken the position that every effort should be made to maintain current levels of service and financial commitment on the part of both Federal and Provincial governments. This position has been explained to the Research Branch in the hope that the Federal government departments of EMR and Agriculture can be encouraged to explore all avenues to jointly maintain the current level of support to the soil survey program. Only by maintaining total Federal support at current annual levels, (shared jointly by EMR and Agriculture) will the soil survey be able to avoid reduction in service and less timely printing of maps.

2.2 CanSIS - ARC/Info Integration

Manitoba has invested considerable resources in automating the capture, storage, retrieval and manipulation of soil and land resource data. Considering the current commitment to automated handling of soil data (both cartographic and related hard data) in the Province, concern has been raised regarding the impact of the ARC/Info system on the present status of our data base. We encourage LRRC as the Federal agency responsible for integration of CanSIS and ARC/Info to make every effort to insure a smooth transition to the new ARC/Info system.

2.3 CanSIS Service

The current lag time experienced in receiving output from the cartographic file is particularly critical as it affects the publication of map projects of small (several sq. miles in extent) and intermediate size (9 to 12 townships in extent). Our objective with such projects is to publish completed maps and reports within 12 to 18 months of completion of field work. Statistical reports listing map units, map unit composition and related areal extent provide extremely useful data to include with each project report. Experience indicates that hard copy maps and camera-ready report manuscripts can be prepared within 12 to 18 months of completing the field work. It is important that the CanSIS cartographic output for Manitoba map projects continue to be made available to accomodate this publication schedule.

Two additional scheduling concerns arise for those projects involving extensive soil sampling and characterization. The inclusion of this data in the published report often presents a scheduling problem for publication. Firstly the Manitoba laboratory must be able to handle the analysis on time and secondly, the edited Detail Soil Descriptions must be available for inclusion in the published report.

Manitoba will continue to steamline local aspects of data handling wherever possible and we support the Cartography section and CanSIS in their efforts to help meet our local publishing deadlines.

2.4 Duplication of Geographic Information Systems

The Provincial Forestry Branch is installing an ARC/Info system as part of the current Federal-Provincial forestry agreement. Forestry is inputting soil data on a trial basis from southeastern Manitoba. This has led to concern by soil survey about possible duplication of effort in digitizing soil data from forested areas of the Province. This is possibly a national concern as well. A second concern relates to the need for a standardized set of soil properties which will serve forestry objectives. Forestry requirements of our data bases should be recognized by soil surveyors involved in developing computerized soil properties files and extended legends for our maps.

2.5 Land Evaluation

Manitoba continues to work towards more quantitative land evaluation. Successful development of an evaluation program for any land use is dependent on the uniformity and adequacy of the soil data base and the availability of suitable evaluation techniques.

Examination of our data base indicates that it is far from uniform as older data is broadly based and dated when compared to current resurvey information. Much of the soil data base is not capable of supporting the more precise quantitative evaluations required today. The older portions of the soil data base obviously require resurvey or update. It was estimated in the 1984 Manitoba Report to ECSS that resurvey of some 30,000 sq. kilometers (12,000 sq. miles) of agricultural soils is critical to their interpretation for wind and water erosion, spreading salinity, loss of natural fertility, pollution by agricultural chemicals and poor drainage. Current estimates show that with present staff, the soil survey would require 30 years to complete the resurvey of critical areas at a suitable level of detail.

Alternate methods of land evaluation, at least for agriculture, are being developed. Techniques are now available to simulate crop growth under a variety of real soil and climate combinations. The results of such modelling exercises can be presented in terms of probability values attached to differing evaluation scenarios.

Manitoba, therefore has two major concerns as we embark on a program to develop more precise land evaluation for a variety of uses: a) adequacy of available inventory data and, b) mobilization and interpretation of that data.

a) Inventory Concern: Manitoba has been involved in two studies to update older soil maps and related soil data. One study is attempting an update of a SIL 3 reconnaissance soil survey of intermediate age (published in 1962). Update and correlation in this project involves sufficient ground truth to verify the composition of all map units and to adjust polygon boundaries and description where required. Map update is justified in this case as the revisions can be republished by inclusion with the map for the surrounding unpublished NTS map sheet.

The second study is concerned with correlation and standardization of the boundary conditions associated with 4 map products varying in age from 1951 to 1984 and in map scale from 1:125,000 using both soil association and soil series based map units and 1:50,000 and 1:20,000 using soil series to describe the map units.

The concerns being raised throughout these studies relate mainly to the methodology employed and the handling of revisions:

- the level of ground truth which will support revised map unit descriptions and adjustments to the map itself but still cover the terrain more quickly than a resurvey must be considered.

- if we have no provision to republish the revised soil map, where should the revised data base reside? There may be questions concerning the status of revised data as opposed to the original data.

- is it more advisable to revise the map legend and develop extended legends for these update products as opposed to attempting any map revision at all? This might be accomplished by judicious sampling and characterization of the old map.

Following evaluation of the results of these two studies we will be in a better position to determine the feasibility of updating older soil survey maps and reports.

b) Mobilization and Interpretation of soil data: This concern relates to the difficulty which we often experience in bringing together the right kind of data at the right time for land evaluation purposes. Present-day land evaluation techniques often utilize other kinds of data (ie. hydrological, meteorological, in addition to soil survey information). The additional resources available through our Federal-Provincial ERDA project (see Section 1.3) will enable the soil survey to accelerate compilation of a soil data base for Manitoba and to initiate development of a system to mobilize and deliver data.

2.6 Technical Support for Soil Survey Field Programs

The full potential for an efficient field program is not being realized due to annual short fall in number of student assistant positions. Although increased numbers of both Federal and Provincial positions is important, at this time a greater concern is to convince appropriate agencies of the Provincial government of the need and merit for a career oriented training program for agricultural students. A second concern is the need to establish more adequate pay schedules to be competitive with comparable Federal Government and University student positions. A recommendation for 1986 addressing these two concerns has been forwarded from the Soil Science Lead Committee to the Manitoba Agricultural Services Coordinating Committee.

Field inventory capability in Manitoba can also be increased significantly by the addition of 3 Federal EG-ESS level 6 soil survey assistants. The addition of these positions would recognize the priority placed on soil inventory by the Province.

2.7 Ancillary Activities Related to Soil Inventory

Correlation, quality control of mapping, updating of old information and land evaluation continue to be priority activities in the Province. The greatest concern lies in the fact that these activities when combined with ECSS working group activities results in available staff being spread too thin.

Local correlation and quality control procedures are ongoing and can be largely maintained by existing staff. Provincial correlation requires more attention in the future and projects to develop a Provincial soil data base (Section 1.3) and to update older soil maps (Section 2.5 a) are serving to focus attention on this need. We plan to make more resources available to address these concerns as part of the Federal-Provincial ERDA proposal.

Land evaluation activities for agriculture currently involve a heavy dependence on modelling techniques to simulate crop growth under a variety of soil-climate combinations. The methodology is in place but it remains to proceed with the application phase. The successful application of this evaluation technique depends on the location of a land evaluation specialist on a permanent basis in Manitoba, or at least in Western Canada to work on local (farm level) application and regional priorities.

3. SUGGESTIONS FOR FUTURE WORK

The focus of the current soil survey program in Manitoba and the foregoing list of concerns leads to several suggestions for future work. These suggestions relate to four specific components of the soil survey program.

3.1 Inventory

The soil inventory in critical areas of Agro Manitoba continues to be a high Provincial priority. The current level of survey activity should be maintained at all costs.

The soil survey should actively explore ways and means of updating and standardizing older soil maps and reports for land areas where resurveys cannot be completed in any reasonable time frame. Soil correlation on a provincial scale will be a major benefit of such activities providing available senior staff can devote sufficent time to the project.

We should continue to allocate resources to test reliability of current mapping projects at all scales. Provision should be made to include a reliability test in all new inventory projects. Resources from LRRC should be available to develop techniques and advise on the use of reliability testing procedures.

3.2 Data Handling

The soil survey has made significant progress in streamlining systems for data capture and storage but there remains a critical need to streamline our data delivery system. The development of a comprehensive soil data base for Manitoba requires much work (i.e. soil names file, soil properties file,

soil interpretation file). We should explore other means of data delivery as supplements to current hard copy reporting methods.

3.3. Interpretations and Land Evaluation

Within this broad topic several specific work activities can be enumerated. There is need to examine all existing guidelines for making interpretations. Agriculture capability guidelines developed nationally for reconnaissance scale mapping are not completely appropriate for local use and application at detail mapping scales. An evaluation group should be established to develop guides which must be tested in local situations on a sustained basis. Local experience and performance related to various soil conditions and properties should be researched, monitored and documented.

The soil survey should continue to compile soil data for inclusion in a Soil Properties File. In addition there should be active liaison with other sources of land resource data, ie. hydrology, meteorology, present land use, as they may affect interpretations for various uses. Emphasis will be directed to evaluation for agriculture, forestry and engineering uses of land.

3.4 Extension

The soil survey at the local level should increase its liaison with user groups. Greater effort is required in extension and information flow. We should deal specifically with use of soil maps and reports and interpretation of soil data. There still exist examples of planning and land management which take place without benefit of the best available soil information.

We endorse the usage of the Generalized Soil Landscape Map and derivative and interpretive maps for broad regional planning and for purposes of extension and education.

SASKATCHEWAN REPORT TO ECSS, OCTOBER 1986

H.P.W. Rostad

SOIL INVENTORY

Soil Mapping

During 1985 and 1986 the Saskatchewan soil survey mapped approximately 2.4 million hectares in west-central Saskatchewan and in the Melfort area. Approximately 350 transects were run to assist in establishing mapping legends and determine the proportion and properties of soil series in major landscape units. To further assist in the characterization of the soils, approximately 1,500 samples were taken for mechanical analysis, 2,100 for conductivity and soluble salts, 1,800 for organic carbon, and 500 for exchangeable cation determination. Preliminary maps and reports will be prepared for 25 rural municipalities by the spring of 1987. As well, all maps will be digitized and entered into CanSIS.

Interpretive Maps and Reports

Three R.M.'s, Wolseley, Indian Head, and Chester have been published in the new larger format with maps and pictures in color. These publications have been well received by the users. Unfortunately, the increased costs have slowed production. This is causing some concern as the province is expecting these publications at a faster rate.

A series of preliminary maps and reports are being prepared to get the soils and interpretive information out quickly. In most cases, the mapping gets underway in the spring and the preliminary map and report are released the following spring. This report includes interpretations for agricultural capability, salinity, surface pH, stones, wind and water erosion, and others. New interpretations for 1986 include estimates of past erosion and suitability of solonetzic soils for deep plowing. The interpretations are listed in a table showing the interpretation for each polygon.

Interpretive maps at 1:1,000,000 for the province showing susceptibility to wind and water erosion have been prepared utilizing the Generalized Soil Landscape Maps and extended legend. A similar map has been prepared showing the severity and extent of soil salinity.

In addition, PFRA in Regina has prepared a wind erosion potential map for 1986-87 utilizing crop cover information and the wind erosion map prepared by LRRC.

SOIL DEGRADATION RESEARCH

Soil Erosion and Landscape Studies

Work is underway by Dr. E. deJong to develop a classification of landform elements based on slope curvature and gradient to assess the relationship between these elements and soil erosion, soil morphology, and productivity.

A quantitative study of wind erosion is underway utilizing wind traps to collect soil moved by saltation. Preliminary results indicate this technique may have promise to compare adjacent soil types or management practices.

Soil Organic Matter Research

Dr. D. Anderson is conducting a study on the impact of breaking and cultivation on Black soils in the aspen-parkland area. He has documented the soil properties at the time of breaking and will monitor the changes over time. Anderson is also co-operating with workers at Colorado State University in developing a soil organic model which can be used with erosion prediction equations. Another study by Dr. Anderson is concerned with the effect of erosion on soil quality and yield. Part of this work measures the effect on yield of adding incremental thicknesses of topsoil to severly erode hill tops. A related study measures the yield on slopes of different degrees of erosion.

Acid Soil Research

Liming plots have been monitored for 4 years measuring yield responses to 5 different rates of lime. In addition PFRA has established field-scale liming plots in the Unity area.

SOIL SALINITY STUDIES

Soil Salinity Investigations

This project is directed by Les Henry of the Soil Science Department, with funding from the Saskatchewan Department of Agriculture and the Canada-Saskatchewan ERDA agreement. The objectives of this project are:

a) To develop models of various types of soil salinity and to document these models.

b) To discover the surface field indicators which characterize each of these models.

c) To train soil workers to identify these indicators in the field.

d) To determine the feasibility of utilizing water from aquifers causing soil salinity.

The areas chosen for these studies are usually a result of requests from landowners with specific salinity problems. The results of the findings are presented to the farmers and extension people in the form of reports and extension meetings.

In addition, Henry is co-operating with the soil survey to identify potential salinity problems and their probable cause as new surveys are undertaken.

Salinity investigations are also underway in the Swift Current and Weyburn areas conducted by PFRA. These studies are usually a result of farmer requests. Approximately 40 quarter sections are studied each year in each area.

Research Into Origin of Salts

Research into the origin of salts on the prairies is being directed by Dr. A. Mermut of the Saskatchewan Institute of Pedology. He suggests that the oxidation of pyrite, originating in the Cretaceous shales, is a source of much of the sodium sulfate in our soils, contributes to the acidity of prairie soils, and to the formation of solonetzic soils. The release of salts is an ongoing process and may have significance in the salinization of prairie soils.

SOLONETZIC SOILS

Tillage Experiments

Research is underway to determine the effect of deep plowing and ripping teatments on Solonetzic soils in the Brown and Dark Brown soil zones. The work is a joint project of the SIP and PFRA. The work is being carried out by Marie Boehm of the soil survey staff and the PFRA soil conservation officers in Weyburn and Rosetown.

Genesis of Solonetzic Soils

This research is designed to study the genetic pathways between Solonchaks and Solonetzic soils in Saskatchewan. Special attention will be paid to understanding the formation of columnar structure, the chemistry of Bnt horizons and the formation of magnesium-bearing calcite.

SOIL VARIABILITY STUDIES

Spatial Variability

A current study involves the investigation of spatial variability of organic matter and aggregate fractions over the landscape. Multivariate analysis will be used to try to relate landscape parameters and erosion indices with soil productivity.

Transects to Evaluate Accuracy of Mapping

A number of transects were run in an area of Solonetzic soils in the Kerrobert area to determine reliability of the mapping and the suitability of map units used in the area.

Genesis of Clay Soils

Objectives of this research were to study morphology, genesis, and mineralogy of clay soils in Saskatchewan and to examine the classification of these soils in both the Canadian system of Soil Classification and the Soil Taxonomy of USA. Results of the studies suggest the necessity to establish a separate order in the Canadian system.

PROJECTED FUTURE REQUIREMENTS

Inventory

The major objective for Saskatchewan is to develop a complete soil

resource data base and associated soil conservation interpretive capacity to assess the nature and distribution of soil degradation to allow appropriate remedial action.

At the present time, an accelerated survey is supported by Canada and Saskatchewan as part of the Canada/Saskatchewan Agricultural Development Agreement. At the end of the present contract, in two years, the resurvey of the province will be about 75% complete. Continued support at the present level would allow the resurvey to be completed by 1994, at which time the major focus of the survey would shift to interpretations.

Research

Continued support is needed in the following fields:

a) Salinity - origin of salts
- causes and cures for soil salinity

b) Soil Degradation models to predict wind and water erosion for prairie conditions.

c) Soil Genesis - genesis of solonetzic soils and luvisolic soils.

d) Land Evaluation - more study is needed into the factors required to evaluate land and predict productivity.

INTERPRETATIONS

ARC/INFO

It is the consensus of the Saskatchewan Institute of Pedology that Agriculture Canada proceed with the implementation of ARC/INFO in Ottawa as quickly as possible. In addition, consideration should be given to the establishment of a similar system in Saskatchewan at the Institute of Pedology.

Implementation of this proposal would allow soil-related information to be made available to producers and other interested individuals in a form that is pertinent to a specific area of land. The proposed data handling and map compilation facility would aid in the development and testing of predictive models in the area of conservation and production. It would also assist in land use analysis due to its capability to integrate data from various sources.

Publications

Saskatchewan strongly objects to the proposed slow down and discontinuation of publishing soil survey reports, particularly until such time as the ARC/INFO system is capable of providing the soils information required by field workers and the general public.

Monitoring

There must be a concerted effort to monitor soil degradation. Not only do we need to know how fast the soil is degrading, but also what effect it is having on productivity, and how this will affect productivity in the future.

ALBERTA REPORT TO ECSS, OCTOBER 1986

K. Pohjakas

This report summarizes the main concerns and the land inventory related activities in Alberta. The information is provided by different subcommittees of the Alberta Soil Advisory Committee, Alberta Institute of Pedology and by provincial government departments.

There are three parts of this report:

1. Status of Soil Inventory and Related Activities.

2. Technical Issue of Concern to Alberta Soil Survey.

3. Recommendation to the ECSS.

1. STATUS OF SOIL INVENTORY AND RELATED ACTIVITIES

1.1 Alberta Soil/Land Inventory Co-ordinating Committee (ASLICC)

The Committee co-ordinates soil/land inventory activities in Alberta. A land base data user and collector survey was concluded which indentified agencies and types of soil/land inventory data collected and stored in Alberta.

Currently a data collection pilot project involving Alberta Agriculture, Forestry and Wildlife is in progress with the aim of identifying the kind of data these different agencies require.

1.2 Soil Survey Mapping Projects - Canada Soil Survey and Alberta Research Council.

2 Level lll projects:

a) 5 p/y approx. 400,000 ha
b) 4 p/y approx. 200,000 ha

1.3 Soil Survey Compilations/Interpretations (1:1 million plus scale)

- water erosion potential (complete)
- wind erosion potential (complete)
- salinity estimate (in progress)
- acid sensitivity map (complete)
- aridity index (in progress)

1.4 Land Irrigability Classification Mapping

Level ll - at 1/4 section about 30,000 ha (1:5000 scale)
Level lll - about 300,000 ha (1:20,000 scale)

1.5 Soil Survey Applied Research in Support of Mapping

- erosion site research and modelling
- land use mapping methodology development
- Level lll mapping methods research
- coal mine reclamation procedures
- pilot project for establishing Level lll contract management procedures, mapping standards and product definition
- acid deposition, modelling of sensitivity
- GIS development - testing of applications and definition of appropriate data bases
- Soil Inventory Database for Management and Planning (SIDMAP) - mapping and modelling using SIDMAP data base
- soil climate - publishing of past monitoring effects

1.6 Alberta Agriculture Applied Research

- drainage inventory
- irrigation of sandy soils
- irrigation of soils with shallow depth to bedrock
- irrigation of Solonetzic soils
- SIDMAP and GIS development
- land base study, possibilities of expanding Alberta agricultural land base
- evaluation of EM-38 for salinity mapping
- determination of soil wind erosion losses pilot project
- deep plowing, ripping and amendment applications on solonetzic soils
- crop production or organic soils including deep plowing, drainage and fertility requirements

1.7 Alberta Forestry/Land and Wildlife
Resource Evaluation and Planning (REAP) project

a) Terrain Classification Activities
   - contract specifications
   - range management
   - detailed samplings

b) Climate Inventory
   - setting up 3 climate monitoring sites

c) Vegetation Inventory
   - vegetation inventory of Aspen Parklands
   - Aspen cull study

d) Integrated Inventories
   - projects related to soil evaluation and land form factors for recreation potential
   - list of active integrated inventories

e) Evaluation Activities related to Agriculture/Forestry
- development and testing of evaluation algorithms and methodologies
- forage ratings
- new Agricultural Rating System for Alberta
- climate analysis
- agroclimatic evaluations
- forestry land capability
- wildlife habitat suitability

1.8 University of Alberta Applied Research

- remote sensing for wetland/land cover
- soil genesis
- deep ploughing response suitability

1.9 Land Capability Classification for Arable Agriculture in Alberta
An Agricultural Rating System was developed to replace several existing rating systems. This system is the result of co-operation by several provincial agencies. It is currently being tested by potential users.

2. TECHNICAL ISSUES OF CONCERN TO ALBERTA SOIL SURVEY

2.1 Interpretations: We continue to need increased effort to improve our definition of interpretations based upon soil or landscape attributes, (e.g. salinity potential, drainability, erosion hazard). We need to establish standards for various types of interpretation, define appropriate levels and conditions for using interpretations and finally define data requirements for interpretations. This last is what the field mappers want to know - What do I have to collect that is not currently collected for soil survey and how do I collect it?

Suggested action: Reactive working group on interpretations. Management at Alberta Forestry/REAP indicated a desire to see a national guidebook published containing soil interpretations for recreation suitability, wildlife habitat, etc.

2.2 Monitoring Degradation: The requirement for monitoring degradation has been accepted and initial efforts have been directed at a national scale. Most mapping in Alberta is currently at SIL 111. We feel we could benefit from nationally recognized standards, procedures and products for:

a) establishing current baseline conditions
b) monitoring change in conditions

Suggested action: Establish a working group on monitoring degradation at SIL 111.

The two issues listed above (interpretations and monitoring) will likely require data not currently collected by Soil Survey or collected but recognized as requiring improvement. Some, but not all Alberta mappers, feel that there will be a need to find new ways of mapping spot occurrences (salinity, water and erosion) and of

describing and mapping surface form in order to satisfy the demands for interpretations and for monitoring data that are now being made of Level lll maps.

2.3 Spot Occurrence Data: There is some feeling that for SIL lll surveys we lack consistent classification systems and procedures for mapping spot occurrence data such as:

a) surface salinity
b) actual erosion
c) water bodies and wetlands (e.g. for drainage/wildlife habitat)

The questions needing to be answered for all three of the above are:

a) Should this information be collected in a routine Level lll soil survey?
b) How do we classify the items (erosion, salinity, water)?
c) How do we map them and agglomerate them for presentation?
d) How do we use the data to make assessments/interpretations?
e) Should these problems be addressed at a national level or project level?

Suggested action: It's probably premature to call for a national working group. This item is for information and discussion only. Other interested individuals might wish to contact Alberta Survey personnel.

2.4 Surface Form/Slope Description and Mapping: There is some debate as to whether current classification systems and mapping procedures are capturing all of the surface form and slope information needed to make interpretations such as erosion susceptibility or drainage suitability. Most Alberta mappers feel that a combination of dominant slope class and landform symbol is sufficient. Some do not. Questions regarding limitations in current procedures include:

a) Can we establish procedures for defining averages and ranges for slope lengths?
b) Is a single class for dominant slope gradient sufficient or should we give slope information in terms of frequences of all slope classes within units?
c) How can we formalize procedures for recognizing units with similar soil assemblages and slope classes but different landform attributes?
d) Is it desirable to be able to produce data on proportions of landscape elements (e.g. crests, depressions) and frequency or spacing of these elements? (e.g. for assessing number, size and spacing of depressions for drainage or knolls for erosion).

Suggested action: An information dialogue should be initiated among individuals with an interest in improving slope/surface form classification and mapping. The ECSS could serve as a venue for advertising this interest and getting people together.

2.5 Land Use/Land Cover Mapping: There appears to be an increase in interest in land use mapping and in relating land use information to

soil survey data. Several questions arise from this interest including:

a) Should this be included as part of routine Level lll soil survey?
b) Is it possible and economical to map land use at a scale suitable for use with SIL lll soil surveys?
c) Can we define standards, classes and contents for land use mapping for various purposes and scales?
d) Should there be a national working group to address the above questions?

Suggested action: That ECSS consider the question of establishing a national working group on land use/land cover mapping.

2.6 Electronic Data Base Management/GIS: There were some concerns regarding this issue expressed by Alberta soil surveyors. These concerns were considered to be different than those recently being addressed by the working group on CanSIS/ARC-INFO conversion. They include:

a) The need to recognize differences between federal (countrywide) and provincial (regional/local) needs with regard to:
   - data base scale and content
   - hardware/software capabilities
   - manpower support and training
b) The need to greatly increase efforts to find and install interfaces that will permit agencies to exchange graphic digital files and all of the information linked to the graphic files in tabular data bases.
c) The need to lobby for increased fiscal support to conduct the work required to establish standards, procedures, products, etc. for use in a digital GIS environment.

Suggested action: The ECSS should make this concern known to CCLRS stressing the need for correlation and standardization of data. The ECSS should charge the CanSIS/Computer Working Group with the establishment of a broad conceptual framework for the Soil/GIS interface. There must also be a mechanism to permit meaningful liason between the national working group and provincial user agencies that have specific needs and have already undertaken to explicitly define their soil data base needs (e.g. Alberta Forestry/REAP).

3. RECOMMENDATION TO THE ECSS

A nationally co-ordinated action is required for developing GIS technology for managing electronic land resource information. There is a need for co-ordinated conceptual framework for GIS implementation and for detailed definition of data requirements based on defined user needs.

Specifically required:

a) Guidelines for converting land base information to electronic form
b) Determine the level of information and the method of collection to be included in the data bank (polygon data/point data)
c) National and provincial co-ordination in GIS data collection and retrieval.

BRITISH COLUMBIA REPORT TO ECSS, OCTOBER 1986

H.A. Luttmerding

The following report highlights progress in soil inventory and related interpretations/derivations that has occurred in B.C. since the last meeting of the Expert Committee. Also included is a brief comment relating to some other aspects of on-going soils studies in the province.

Continuing out-of-province travel restrictions again prevent me from attending and participating in the Expert Meeting. Dave Moon has kindly agreed to assume the role of B.C. representative for which I would like to thank him very much.

SOIL INVENTORY AND RELATED INTERPRETATIONS/DERIVATIONS

1. East Vancouver Island Detail Soil Survey

Field mapping on this project ended in 1985 due to termination of funding and has resulted in the Oyster River-Campbell River area remaining unmapped.

Reports and maps for the surveyed portion are in various stages of completion. Soil maps (1:20000 scale) and report for the Duncan-Naniamo area are published as are new 'Land Capability for Agriculture' maps. All relevant soil polygon and cartographic data is entered in the provincial CAPAMP computer system and several computer derived products, including Soil Drainage, Irrigation Water Requirements, Soil Sensitivity to Acidification and Agricultural Soil Management Groups, are available.

Computer input of data for the remainder of the project area continues with the Qualicum Beach-Parksville portion most advanced. Interim soil maps and most interpretive products are now available. Compilation and data input for the Courtenay-Alberni area continues and should be completed this coming winter. A soils report covering the combined Qualicum Beach-Parksville and Courtenay-Alberni areas will be initiated this winter as well.

Detailed mapping of North Saanich Municipality was completed in 1985, mainly for the purpose of determining urban suitability and especially potential for septic tank affluent disposal. Interim soil maps and interpretations are now available. Funding for the field aspects of this study was provided by the Municipality.

Detailed mapping was initiated in 1986 in the 'Highlands' area just outside Victoria to provide soils and related information suitable for urban development planning in this hilly and rocky area. Field mapping, funded by the Capital Regional District, is scheduled to be completed in 1987.

2. Field mapping of the Gulf Island project was completed by the federal unit in 1986. Reports and maps are in various stages of completion and publication. Volume #1 (Saltspring Island) has been submitted for publication, Volumes #2 and #3 (Pender-Mayne-Saturna Islands and Galiano-Valdes-Thetis Islands) have been submitted for edit while Volume #4 (Galiano and adjacent small islands) has been submitted for technical edit (and maps

for digitizing). Interim maps and first draft of report have been prepared for Volume #5 area (Sidney, James and associated islands).

3. The existing soil information for the North Okanagan Valley is being refined and modified under contract into a consistent product at 1:20000 scale. The existing data and maps are at a variety of scales and detail making appropriate interpretations and derivations difficult to accomplish. The project, to be completed in 1986, is funded by Waste Management Branch, B.C. Ministry of Environment and Parks, and will provide a data base suitable for interpretations relating to water quality in Okanagan Lake.

The above information, together with the 1:20000 scale mapping in the South Okanagan and 1:50000 scale mapping on the adjacent uplands of the Okanagan Lake drainage are being used to provide computer derived map and tabular products relating to potential erosion and sediment production, phosphorous transmissivity and septic tank suitability, among others.

4. Soil Reports and maps for a variety of areas in the province have, or will soon be published. These include:

a) Power River Valley (1:20000) - submitted for edit.

b) Fort St. John-Dawson Creek (#42) - 1:100000 maps published, report submitted for publication.

c) McAllister-Graham Area (#35) - draft report and 1:100000 manuscript maps completed.

d) Williams Lake-Alexis Creek (#53) - report edited and submitted for publication, maps clean but not published.

e) Nazko (#38) - report edited, maps digitized and clean but not published.

f) Mill and Woodfibre Creeks - maps published, report submitted for publication.

f) Horsefly-Kiethley Creek (#32) - published.

h) Barkerville (#40) - published.

i) South Okanagan-Similkameen area - 1:20000 maps and report published.

j) South Vancouver Island - report published, 1:100000 maps in publication (manuscript copies available).

k) Jarvis Creek-Markhill River - report in final edit, 1:100000 maps available.

l) Bonaparte Lake-Canim River - report submitted for publication, 1:100000 manuscript maps available.

m) Ashcroft - report in final draft, 1:100000 manuscript maps available.

5. Land Capability for Agriculture Revision - Fort St. John-Dawson Creek area. Updated climate capability for agriculture information necessitates that the existing agriculture capability maps be revised. The revisions will be undertaken during the winter of 1986 by the federal soil survey unit.

6. A soil survey reliability pilot study was carried out on parts of the East Vancouver Island survey in 1985 and after methodology modification, was applied to a portion of the Gulf Islands survey as well. A report by the federal unit of the results and implications of the studies will be submitted in 1987 to federal and provincial correlators for technical edit.

7. A cooperative project between the federal and provincial soil survey units has been initiated to produce a small scale (1:1M) soil map of B.C. A manuscript for the southern half of the province is scheduled to be completed by Fall/87 while the northern half is to be finished one year later. The required data base (as per the national guidelines) will be enlarged to include information on biogeoclimatic zones and more definitive bedrock separations to meet specific provincial interpretive needs.

8. A Land Use Classification has been developed by the Ministries of Agriculture and Fisheries and Ministry of Environment and Parks for use in B.C. The hierarchical classification, best suited for larger scale mapping, is currently being applied in the Osoyoos, Kelowna and Armstrong area.

9. A CAPAMP users document is currently being prepared which describes the structure, data input methods and other technical details of the B.C. CAPAMP computer system. The manual describes the soil polygon, soil cartographic, terrain, wildlife habitat, biogeoclimatic and forest cover files and also describes the algorithms currently available.

10. Wildlife habitat mapping is continuing by the Wildlife Branch, MOE&P at scales ranging from 1:20000 to 1:500000. Projects range from broad reconnaissance in the northwest, reconnaissance in Wells Gray Provincial Park and Purcell Wilderness Conservency, to detail mapping in parts of the Kootenay (Sheep Mountain) and Cariboo areas. The habitat maps combine parameters from terrain, soils and vegetation into one map suitable for a variety of wildlife interpretations.

11. Biogeoclimatic maps (1:1M) have been published by BCMF&L for the Prince George Forest Region and Vancouver Island. Coverage of the rest of the province will be published in the near future.

OTHER SOIL RELATED STUDIES

1. The BCMOA&F continues to manage the Boundary Bay Water Management project. The project, in the lowlands of the lower Fraser Valley, is used to demonstrate to producers the benefits of controlling excess water on agricultural land. As well, soil fertility evaluation sites in the Central and Southern Interior are used to demonstrate the effects of various fertilizer practises on crop growth.

2. Soil Science Workshops - Excellent and well attended workshops dealing with the role of soil analysis in resource management (1985) and

forest soil degradation (1986) were presented. The Proceedings from the first is currently available while the latter should be published in early 1987.

3. The Soils Department, UBC, is currently conducting studies in the Matsqui Prairie area of the Lower Fraser Valley to evaluate agricultural productivity interpretations based on complex soil map units.

4. A cooperative study involving BCMA&F, BCME&P, and B.C. Fruit Growers Association has been initiated in which soils, climate, tree fruit production, management and suitability will be combined via computer data bases to provide information for improved planning, forecasting and management of B.C.'s tree fruit industry.

5. Soil Conservation - A contract has been let to Land Sense Limited, to prepare a report examining soil conservation issues in B.C. from a multidisciplinary and interagency perspective. The report will include economic impacts, and provide recommendations on priorities, resources, legislation and infrastructure required to solve the problem.

6. The Ministry of Forest and Lands is also addressing soil conservation. They have struck a committee to investigate soil degradation in forested areas. Problem analysis is currently underway which will identify the type, severity and extent of degradation currently occurring.

Studies nearing completion include evaluation of rutting, skid roads and landings on forest productivity and site damage. Monitoring of soil changes after prescribed fire is ongoing as are studies dealing with the soil microclimate aspects of white spruce seedling establishment.

Nearing publication is a methodology for mapping the biogeoclimatic classification system developed in the Truax Creek and Pimpernel Creek pilot study areas.

7. Studies relating to 'acid rain' are continuing. Canadian Forestry Service, under the ARNEWS program, has established 15 long term soil and vegetation monitoring sites in southern B.C. The BCME&P has located a further six sites in the Lower Mainland although monitoring has not yet started. Studies related to comparisons of tree ring chemistry and changes in growth rates in areas impacted by airborne pollutants is underway as is preparation of guidelines for air quality inspections of vegetation damage.

8. The Canadian Forestry Service is addressing other aspects of soils as well. Studies underway include impacts of site preparation for root disease control on site productivity; vegetation, soil development and forest productivity on landslides, Queen Charlotte Islands; impact of downhill skidding on soils and subsequent tree growth; and impacts of clearcut harvesting on ground water levels, sub-surface flow and stream flow, Carnation Creek. Other studies address the impacts of prescribed burning on tree nutrition, height growth, productivity, establishment and rehabilitation in various parts of the province. Another study evaluates logging and post-logging treatment impacts on the physical and chemical characteristics of soils to identify factors that lead to regeneration failure on Not Sufficiently Restocks (NSR) land.

9. Small scale (1:500000) soil degradation landscape maps were produced for most of the agricultural parts of the province, under contract. The maps and expanded legends have been reviewed and edited by the appropriate provincial/federal staff and forwarded to Ottawa as part of the national soil degradation program.

10. Several items relating to the forest industry should be highlighted. Coast Logging Guidelines and a Watershed Workbook for Coastal British Columbia are currently in preparation by joint industry/government committees. Inherent in these guidelines are the requirements for assessment of terrain stability; sediment production; watershed runoff characteristics; and soil productive capacity.

Pre-harvest Assessments, including a site productivity/site sensitivity assessment, using the biogeoclimatic system are now required for most harvest areas prior to approvals to proceed with road construction and logging.

An increased awareness of the loss of site productivity and impact on non-timber resources by various forest management activities is resulting in a necessity for more training and extension. Subjects such as fate of pesticides and fertilizers in soils; industrial waste disposal; site degradation associated with mechanized logging (feller-bunchers, etc.) on the coast; and slashburning effects on long-term productivity are included.

RECOMMENDATIONS TO EXPERT COMMITTEE ON SOIL SURVEY

1. Continued and increasing emphasis on compatibility of data systems to allow efficient and rapid transfer of information between organizations and users (e.g. BCSIS/CAPAMP and CANSIS/ARCINFO).

2. Immediate distribution of the soil classification revisions approved at the 1984 meetings (I understand they are available now). Waiting until the revised version of the Canadian Soil Classification is published (1987?) causes an undue delay in making the revisions available for routine use.

3. Discussion between Ottawa cartography and client groups to assign new priorities and target dates for publishing soil maps, if existing priorities and dates cannot be met, is required. These decisions now appear to be made unilaterally.

4. Expert Committee on Soil Survey provide written documentation supporting the efforts of provincial committee members to attend meetings. Current restraint provincially makes authorization for travel very difficult and any assistance would be very beneficial.

5. Filling of vacant federal soils positions in B.C. should be strongly supported. A recently established soil classification/interpretation course at UBC, for example, can no longer be offered due to unavailability of federal staff to assist in offering the course.

PFRA REPORT TO ECSS, OCTOBER 1986

W.R.A. Harron

The Prairie Farm Rehabilitation Administration (PFRA) has been involved in a variety of soil conservation activities aimed at on-farm mitigation of soil degradation problems. At this stage, the report will briefly update our program with emphasis on direction. Of interest to this group is how PFRA views itself as a user of soil survey information.

Although PFRA is involved in many aspects of soil degradation including loss of organic matter, solonetzic soils soil acidity, the major areas of activity at this time are dryland salinity and wind erosion.

A major portion of PFRA resources are devoted to investigation of on-farm salinity problems. Requests for technical assistance are initiated by a farmer, through one of the organized soil conservation groups. The area conservationist then proceeds through an investigation using existing data, a drilling and monitoring program to determine cropping practices to reduce the effect of salinity on the farm operations.

Presently, we have a full commitment of 40 to 50 quarter section requests in each of the Swift Current and Weyburn, Saskatchewan and Lethbridge, Alberta areas. This workload will present a backlog situation for next year. The interest in salinity problems has increased significantly in other areas, notably east-central Alberta and central Saskatchewan. Additional requests for investigations will be forthcoming from certain areas in Manitoba.

In view of increasing requests, PFRA has been testing out new approaches to salinity investigations rather than taking them quarter by quarter. In the Rural Municipality of Mountainview near Rosetown, Saskatchewan, a hydrogeologic study has been prepared to outline the causes of salinity in the area. Selected sites are studied in more detail using the usual drilling and water table monitoring programs. The detailed investigations form the basis for recommendations on any other request in the area. Reports can be prepared with a minimum of additional field work, allowing the area conservationists to respond to more requests with no loss in confidence in the recommendation.

The current program of preparing soil survey reports on a Rural Municipality basis in Saskatchewan is well suited to this new approach. PFRA looks forward to using this information in the preliminary studies and is willing to share any information that has been developed.

There has been a lack of consensus on models in the salinization process and approaches to investigate these models. Alberta Agriculture has initiated the development of a salinity manual designed to outline the steps involved in preparing recommendations to a farmer with respect to a salinity problem. To promote a wider discussion, PFRA has become involved with the view of expanding the scope of the manual on a Prairie wide basis. One major organization meeting has been held to discuss outline, format and selection of authors. The majority of the work is scheduled for the winter of 1986-87 with completion in 1987.

One area in the manual that will receive more attention than it has been given in the past is the interpretation of site specific soils information for salinity investigations. There has not been adequate use of soil profile inspections to provide clues to the nature of salinity problems. This exercise will require input from soil survey units in the three Prairie Provinces.

On a larger scale, PFRA is still faced with the problem of an accurate assessment of the area of salt-affected soils on the Prairies. The wide variations in estimates of extent, severity and rate of growth as determined by various studies, present problems in making policy statements regarding the salinity problem.

The apparent lack of agreement between professionals is not a great problem in the field. It doesn't matter whether salinity is increasing at one or ten percent per year to a farmer that has seen half of a quarter-section become saline. In that regard, we can measure the problem of salinity, not by the acres from a LandSat photo, but by the number of farmers requesting the investigation service.

The second major concern of PFRA is with wind erosion. In 1985 PFRA produced a map outlining the risk of wind erosion in the drought affected areas of Southwestern Saskatchewan. A similar map was produced with Alberta Agriculture. The basis for the map was the generalized soils map and land use maps to outline areas of risk which were further modified by a farmer interview. Limited field sampling indicated that the residue cover provided a statistically significant measurement to separate high and moderate risk classes.

The main component missing from erosion risk maps is the vegetative or residue cover factor. Currently, PFRA soil conservationists are engaged in a residue cover survey in order to prepare a prairie wide map to predict the risk of soil erosion in the spring of 1987. Using the LRRC erosion risk maps and land use maps as a base for sampling, it is possible to prepare a wind erosion risk map that incorporates residue cover.

The map will be ready in the winter of 1986-87 for use by the Area Conservationist and Provincial counterparts for extension and awareness programs. It will also be used in the ongoing drought monitoring program and for policy decisions. This exercise is expected to become a component in a soil conservation monitoring program and will be evaluated annually to make appropriate modifications in data collection and presentation.

There have been a few problems encountered in producing the wind erosion map. First is the methodology of sampling. The rope method of measuring residue cover is considered too slow for its accuracy. An experienced eye can judge percent cover as accurately and more quickly. The photo comparison method would be appropriate except a good set of photos does not exist for most crops. Part of this year's exercise will be to develop a set of photographs for measuring residue in oilseeds (flax and canola).

The base of the maps will be erosion risk maps and land use maps developed by LRRC. PFRA does not have the facilities for major mapping exercises. The availability of derivative maps based on the permanent soil

characteristics and interpretive data bases is crucial to this project. The erosion risk map is viewed as a permanent attribute that is modified annually by residue cover. It is important to develop a memo to interact the risk map produced by LRRC and the residue cover data collected by PFRA.

PFRA has been reviewing methods for evaluating soil conservation efforts. One route to consider is to observe changes in land use. In terms of land use, the most important component is cropping practices. The question to answer is whether cropping practices are changing on a local or regional basis in a direction that indicates greater awareness of soil conservation at the farm level. There are many ways to assess changes either through a land base with LandSat imagery or through economic indicators such as the sales of no-till drills. PFRA is asking for direction and input into assessment of the impact of soil conservation awareness on the agricultural community.

In conclusion, there are numerous areas in which LRRC and PFRA can interact in a manner to be mutually beneficial to the goal of providing competent technical assistance to western Canadian farmers.

WORKING GROUP REPORTS

EXPERT COMMITTEE ON SOIL SURVEY: 7TH MEETING

OTTAWA, ONTARIO

20-21ST OCTOBER 1986

SOIL CLIMATE WORKING GROUP STATUS REPORT

G.F. Mills

INTRODUCTION

An "ad hoc" working group first met to discuss the role of soil family climate in the Canadian System of Soil Classification in 1980. This group was formalized as the Soil Climate Working Group of the Expert Committee on Soil Survey (ECSS) in 1981. The working group had regional representation and accepted a mandate dealing primarily with soil temperature aspects of soil climate. Liaison was to be maintained with the Soil Water Interest Working Group of ECSS dealing primarily with soil moisture relations.

The objective defined for the Soil Climate Working Group in 1980 was:

> "To facilitate the study of relationships between soil, soil temperature and aerial temperature for the purpose of better defining the role of soil temperature in the Canadian System of Soil Classification and the function it may serve for soil correlation, soil interpretation and land evaluation."

The Working Group last met in 1983 when a two-day workshop was convened. Subsequently, progress reports were obtained by telephone and correspondence for presentation to the Expert Committee on Soil Survey in 1984 and 1985.

The purpose of this report is to provide an updated status report on Working Group activities and to formulate recommendations regarding future activities.

REGIONAL ACTIVITIES

Summary reports were received from 10 regional working group representatives.

Newfoundland - E. Woodrow

Two long term sites are maintained by Atmospheric Environment Service (AES) with the data archived by AES. Although soil climate is used as the highest level of mapping stratification in Newfoundland, very little soil temperature and soil moisture data exist. The need for soil climate data at a more refined and detailed level is apparent. They would like to include: soil temperature measurements with six stations measuring air temperature and humidity. Priority should be placed on revising the "Methods Manual" and the inventory of soil climate data.

Nova Scotia - K.T. Webb

Nova Scotia is maintaining 17 active soil temperature monitoring sites of which 12 sites have 5 years of data with at least 60 observations. These data reside in the CanSIS monitoring file. Analysis of 5 longer term sites has been requested. Nova Scotia has sufficient thermistors for short term needs and is prepared to contribute to revision of the "Methods Manual".

New Brunswick - S.H. Fahmy

New Brunswick was maintaining 13 active monitoring sites in 1984-85 but abandoned them in 1985-86 due to monitoring costs. The longest duration of data is 3 years and it is stored in the CanSIS monitoring file. Analysis has been by graphical manual means. In 1986, 3 new sites were installed on a toposequence with instrumentation at the midpoint of the Ap horizon. New Brunswick has sufficient thermistors for short-term needs.

Quebec - J.M. Cossette

Cooperative study of soil temperature involving soil survey, the Department of Soil Science, Laval University and the Agrometeorology Section are continuing near St. Hyacinth. Soil climate studies at 10 sites in the St. Lawrence Lowland are also continuing as part of a Ph.D. graduate study.

Ontario

A number of benchmark sites established to monitor water table fluctuation also include soil temperature monitoring.

Manitoba - G.F. Mills

Soil survey staff in Manitoba are maintaining 83 active soil temperature monitoring sites across a south-north geographic gradient (from latitude 49°07'N to 56°17'N, a distance of 780 km). Several detailed toposequence studies including soil water table monitoring are also active. Thermistor instrumentation was installed at 36 of these sites in 1985-86. As of October 1986, the Manitoba soil temperature file contained 9,194 records from 220 sites. Data has been analyzed for 185 sites. The number of observations at these sites is as follows:

69 sites have	<20	observations*
50 sites have	21 - 40	observations
47 sites have	41 - 60	observations
54 sites have	>60	observations

* 36 sites with less than 20 observations have thermistor instrumentation installed in 1985-86

The Manitoba soil temperature file has been placed on tape for transfer to the CanSIS monitoring file (some 64,000 observations). Manitoba has sufficient thermistors for the remainder of the 1986 field season. Priority is for development of a plan to analyze available soil temperature on a national scale and to complete revisions to the "Methods Manual".

Saskatchewan - R.J. St. Arnaud

Soil temperature monitoring activity is related to Ph.D. research programs. The St. Denis site has been discontinued and 3 years of data will be analyzed this year. Intensive soil temperature measurements have been recorded since the fall of 1985 and will continue to the spring of 1987 along a transect in the Mayfair Association (instrumentation includes 1 site upper slope, 2 sites mid slope, 2 sites lower slope and mid point in a temporary

slough). These studies indicate that soil temperature monitoring should take place on sites with complete micro-site descriptions (ie. slope, aspect, moisture condition, soil profile type and crop management).

Alberta - A. Howard

Monitoring activities are continuing on a soil erosion study in east-central Alberta. Several parameters are being measured on an intensive basis. Soil climate monitoring is also incorporated in revegetation studies of mining reclamation areas at Grande Cache.

The data from older sites which have been terminated are currently being analyzed.

British Columbia - D. Spittlehouse

Soil temperature study is ongoing in the B.C. Ministry of Forests as a component on 7 or 8 projects. Each project includes a range of site conditions recognizing landscape properties and management operation. The objective of this work is to study management and site conditions affecting forest regeneration. As such, the emphasis is on very frequent observations of near surface (0-30 cm) temperature with less emphasis on lower depths. Near surface temperature is being modelled for operational use related to ecology and silvicultural aspects. Most projects are for 3 years duration involving clear cutting and a control in various forest regions of B.C. ranging from the Lower Mainland to the southern and central Interior. All current monitoring is by data logger and stored on disc format.

North West Territories - C. Tarnocai

Soil temperature probes were installed and the associated soils were described at 13 locations along the Norman Wells pipeline during August, 1986. At each location, one thermistor probe was installed in the undisturbed area at least 10 m from the pipeline right-of-way (ROW) and a second one was installed in the disturbed area on the ROW. Monitoring on a monthly basis will be maintained by pipeline personnel during their regular inspection of the pipeline. Monitoring is continuing at 8 sites in the Inuvik area.

Yukon - S. Smith

Monitoring is continuing at 8 sites with a maximum of 2½ years of observations. Data has been analyzed for one site. Data from one site is recorded remotely and transmitted via satellite. Sufficient thermistors are available for short term use. Soil climate data should continue to be utilized at the soil family level of the soil taxonomy.

Agrometeorology Section - A. Bootsma

An improved regression equation for estimating soil temperature during winter months in the Atlantic Region has been developed through use of predictor variables related to depth of snow cover on the ground. The section is involved with Atmospheric Environment Service in a cooperative project to upgrade daily snow-on-ground data for 250 stations. A project

to verify AES soil temperature data is on hold due to limited resources. A study to evaluate effect of length of sampling period on estimated soil climate parameters indicates:

1) for areas with snow cover, a 4 variable model provides a better estimate of the soil temperature curve;

2) that 3 years sampling at a site should produce results of sufficient accuracy to satisfy classification at the national scale. Greater accuracy would be required to satisfy local scale subdivision.

Evaluation of improved curve fitting procedures is being applied to 12 and 4 equally spaced intervals. Preliminary results suggest that a better fit to long term data is possible using the new equation.

Summary of Regional Activities

Interest in the characterization of soil climate remains high and monitoring programs involving soil survey units in Nova Scotia, Quebec, Ontario, Manitoba, Alberta, Yukon and North West Territories are continuing at varying levels of activity. Soil climate study in British Columbia is ongoing in the Ministry of Forests and through research at University of B.C.

The need for soil temperature data is recognized in other areas by inclusion of a soil temperature component in various agronomic research projects in Saskatchewan and Manitoba and forest regeneration studies in British Columbia.

There still exists a substantial number of Working Group priorities which remain more or less outstanding at this time:

1. Revisions to the "Methodology for Monitoring Soil Temperature" have not been completed.

2. Preliminary evaluation of soil temperature data was undertaken for our Workshop in 1983, but evaluation of the data has not been attempted with regard to:

   a) integration of soil climate with soil taxonomy
   b) integration of soil climate with SWIG
   c) interpretation of soil temperature data for various biological and physical uses of soil
   d) use of soil climate for correlation purposes

Indication from regional representatives is that in times of budgetary restraint maintenance of a soil climate monitoring program is not high priority. However, it is pointed out that characterization of soil climate must take into account temporal variability and therefore must be monitored over time. We should also realize that in many parts of Canada, soil climate data will not be collected unless soil survey assumes responsibility for the work or is involved in cooperative studies with other agencies. It is hoped

that monitoring activities can be maintained if we study soil climate in relation to other long-term mission oriented activities such as study of salinization, soil erosion and soil moisture regime. Economy and efficiency in monitoring is expected where several soil parameters or conditions are examined at one location at one time.

RECOMMENDATION TO ECSS

As outgoing chairman of the Soil Climate Working Group there are two concerns which I wish to draw to the attention of the ECSS.

A major concern relates to the objectives defined for the Soil Climate Working Group. Considering that emphasis by the working group to date has been towards monitoring and data collection it is important that activity continue in data analyses and evaluation at both local and national levels. Continuing leadership, coordination and additional effort are required if we are to show progress in achieving the remaining objectives established for the working group.

A second concern relates to the need to integrate soil and soil climate (including soil temperature and soil moisture) with a broad regional climatic reference. The need has been expressed for a suitable climatic framework at the national level which soil surveys can use to stratify mapping and correlation. One such reference is Ecoclimatic regions which are broad areas on the earth's surface characterized by distinctive ecological response to climate as expressed by vegetation and reflected in soils, fauna and water. Within such regions the ecologically effective climate will result in the development of similar vegetation successional trends on similar soil materials occurring on similar positions in the landscape (1). Soil correlation within such a framework may necessitate definition and delineation of subregional separations which remain within the broad national framework. In addition, the relationship of soils to the local and regional ecology should be enhanced by the addition of those aerial climatic parameters affecting evaluation for biological and physical uses of land. Continuing effort is required on the part of soil correlators, climatologists and ecologists to ensure the best possible integration of soil surveys in Canada with known ecologic relationships.

Therefore, the recommendation from the Soil Climate Working Group to the ECSS is as follows:

> An in-depth analyses of existing long-term soil temperature data should be initiated as a cooperative project between staff of the Agrometeorology Section of the Land Resource Research Centre and appropriate regional soil survey and correlation staff. The analyses should address the following specific objectives:
>
> 1) <u>to assess relationships between soil temperature and crop yields and/or management</u>
>
> 2) <u>to evaluate and advise on the integration of soil climate and soil water (SWIG) criteria in the Canadian System of Soil Classification</u>

3) to evaluate the potenial use and application of soil climate criteria for soil correlation at local, regional and national levels

The intent of this recommendation is to ensure that leadership, coordination and resources are available to proceed with the cooperative analyses and evaluation of soil climate data:

Objective 1 Under the leadership of the Agrometeorology Section and with the support of soil survey staff, should assess potentials and limitations for crop yields and provide soil temperature data for inclusion in various crop models.

Objective 2 and 3 Under the leadership of soil correlation staff with cooperation from the Agrometeorology Section should:

a) evaluate the merit and feasibility of including soil climate criteria in soil taxonomy. The interpretation and application of soil climate data must be well established to justify its inclusion in the soil taxonomy at more detailed and precisely defined levels; and,

b) evaluate the potential use of soil climate properties to provide additional characterization of Ecoclimatic Regions and Subregions and to verify or adjust boundaries and descriptions. Regions defined in this way serve as one of the bases for stratifying soil mapping throughout Canada.

These objectives can best be achieved by organizing a nationally recognized project with regional representation and adequate support and cooperation as outlined in this recommendation.

References

1) Ecoclimatic Regions of Canada. 1986. Unpublished Manuscript. Lands Directorate, Environment Canada, Ottawa.

Acknowledgements

The chairman of the Soil Climate Working Group gratefully acknowledges time and effort input by the Working Group members since 1980. Regional input to this report is provided by E. Woodrow (Newfoundland), K.T. Webb (Nova Scotia), S.H. Fahmy (New Brunswick), J.M. Cossette (Quebec), G.F. Mills (Manitoba), R.J. St. Arnaud (Saskatchewan), A. Howard (Alberta), D. Spittlehouse (British Columbia), C. Tarnocai (North West Territories), S. Smith (Yukon) and A. Bootsma (Agrometeorology Section).

SOIL CLASSIFICATION WORKING GROUP STATUS REPORT

C. Tarnocai

1. Soil classification changes agreed to during the last working group meeting

As agreed in Guelph, a publication entitled "Amendments to the Canadian Soil Classification System" was prepared.

2. The Canadian Soil Classification book

a. In July, 1986 D.S.S. indicated that they had no more English copies of this book (they still have 500 French copies).

b. According to the D.S.S. records, 800 English copies and 200 French copies of the book were sold per year.

c. It was suggested that a revised version of the book be printed incorporating the changes included in the above-mentioned amendment publication.

d. The estimated cost of publishing this revised book is:

3000 English copies	$13,384.00
800 French copies	$ 8,410.00

e. Suggestions made by RPS for covering the publication costs and presented to management for a final decision are:

i. Supply and Services will cover the publication costs (since the book is selling well and it is classified category A - "best-seller" - by Supply and Services).

ii. RPS will cover the publication costs (this would require rearrangement of LRRC's publication priorities).

iii. Only the revised English version will be printed and an addendum will be prepared for the remaining 500 French copies.

3. 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 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 surfixes 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. Field testing of this proposal will be carried out next year.

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

4. Recommendation

It is recommended that the Soil Classification Working Group meet within the next two years to deal with these recommendations.

5. References

Dasog, C.S. 1986. The genesis and classification of clay soils in Saskatchewan. Ph.D. thesis, University of Saskatchewan, Saskatoon.

Fox, C.A. 1984. Characteristics of the folisolic soils of British Columbia. Proceedings of the Sixth Annual Meeting of the Expert Committee on Soil Survey, Ottawa, p. 205-232.

Ross, G.J., Wang, C. and Schuppli, P.A. 1985. Hydroxylamine and ammonium oxalate solutions as extractants for iron and aluminum from soils. J. Soil Sci. Soc. Am. 49:783-785.

Wang, C. and Kodama, H. 1986. Pedogenic imogolite in sandy Brunisols of eastern Ontario. Can. J. Soil Sci. 66:135-142.

Wang, C., McKeague, J.A. and Kodama, H. 1986. Pedogenic imogolite and soil environments: Case study of Spodosols in Quebec, Canada. J. Soil Sci. Soc. Am. 50:711-718.

SOIL DEGRADATION WORKING GROUP STATUS REPORT

D.R. Coote

National Level Activities:

The primary activity linking members of the Working Group at the national level since the last report (November, 1984) has been the degradation interpretations of 1:500,000 and 1:1M generalized soil landscape maps (GSLM).

Several approaches have been developed to enable estimates to be made of the economic implications of soil degradation in Eastern Canada and Southern B.C. These included: water and wind erosion risk using the Universal Soil Loss Equation (USLE) and the Wind Erosion Equation (WEE); acidification risk based on soil sensitivity to acidification and combined fertilizer and acid rain input estimates; and an attempt to rate compaction risk using soil texture and drainage as sensitivity indicators, and tillage and harvesting practices to estimate mechanical effects.

In the Prairie Provinces, a wind erosion risk model has been finalized which appears to be superior to the WEE, and maps of wind erosion risk and the affect of crop residues are now available in all three provinces. Water erosion risk for Alberta has been completed at the 1:1M scale using the SIDMAP data base rather than the GSLM polygons. In Saskatchewan and Manitoba, water erosion risk data are available for use with the GSLM in digital form, but have yet to be mapped on the CanSIS plotter.

Polygons of the GSLM have been rated for salinity (extent, landscape position and chemistry) in Saskatchewan and Manitoba using standardized map units. The data are available in digital form, but have yet to be mapped on the CanSIS plotter. Assessment of the Alberta GSLM polygons, using the same approach, is currently underway.

Provincial Level Activities:

British Columbia

Soil erosion plots in the Peace River region have been maintained. There are now about 6 full years of data, and results are providing a good picture of the year-round water erosion problem in this region. (A paper prepared by van Vliet in 1985).

Alberta

A detailed salinity mapping project (1:20,000) of 3 townships in Southern Alberta was contracted out. This EM-38 data base is providing a valuable check against which the 1:1M salinity map (currently in preparation) and other salinity assessments can be compared. Alberta Research Council (R. Howitt) has been monitoring erosion in hummocky landscapes east of Edmonton. Rainfall intensities, snowmelt, water tables, runoff and sediment are being monitored as input to a terrain-erosion model.

Saskatchewan

Assessment of past wind and water erosion is now to be included in soil survey reports. Preliminary trials have been carried out this year with a soil map polygon rating system. The system will be revised over the winter period. In a cooperative project with the University of Saskatchewan, relative wind erodibility measurements in the Saskatoon area have been started using a "snow fence trap". If successful, these will be used in monitoring the effects of texture, topography and slope position on relative wind erodibility.

Manitoba

An evaluation is underway of the suitability of over 30 sites, sampled and characterized up to 20 years ago, as sources of information for the assessment of trends in soil salinity. The sites are equipped with water table wells and water samples have been collected. Soil resampling at 30 cm intervals to 3 m depth has been carried out for determination of salinity and major ions. The purpose is to determine if significant changes have occurred, and if any trends can be identified.

Ontario

Calibration of a portable rainfall simulator has been completed. It has been used to examine erodibility and hydrological properties of 4 soils, and a detailed evaluation of the data is currently underway. Interpretations of erosion risk have been completed for the Haldimand-Norfolk and Ottawa-Carleton map sheets. Inventories have been undertaken of tillage and land management practices, and of pesticide usage, in southern Ontario in anticipation of pullution source and transport studies soon to be established. Soil survey personnel are intimately involved with the recently approved Southwestern Ontario Soil and Water Quality Enhancement Program (SWEEP), providing input to soil erosion, soil structure and water quality studies in monitored watersheds. In eastern Ontario, a comparative study of soil erosion rates, bulk density and hydraulic conductivity under conventional and zero-tilled corn has been completed, but data analysis has yet to be undertaken.

Québec

Survey work has continued to have highest priority in Québec, and soil survey personnel have not had time to pursue soil degradation working group related activities.

New Brunswick

Soil survey has cooperated closely with the Research Station (L. Chow) in the establishment of soil erosion monitoring plots in the potato-growing region near Grand Falls. They have also worked with other ERDA supported projects including improvement of severely eroded lands and soils with dense subsoil layers. Resampling has been carried out at sites established in 1966 to monitor heavy metal contamination from a smelter in Northeastern New Brunswick. Samples have been collected at 10 cm intervals to 30 cm. This is part of a 5-year repeat-sampling program. Data have yet to be analysed.

Nova Scotia

Soil Survey personnel worked closely with a consultant group (Jaques, Whitford and Assoc.) in the preparation of a report on Soil Degradation in Nova Scotia, completed in 1985. Regrettably, there seems to be a loss of potentially valuable information in Nova Scotia with the termination of the erosion monitoring plots at Truro (discontinued) and Stewiake (dismantled).

Prince Edward Island

Soil survey has been closely associated with two ERDA Contracts: one to identify and evaluate erosion control technologies for PEI, and develop a detailed conservation plan for part of the Wilmot Creek watershed (Monenco); the other to model and quantify soil erosion, also in the Wilmot Creek watershed (T.U.N.S.). The soil survey has also been working with Habitat Canada in Wilmot and Montague Creeks to improve environmental quality for waterfowl and fish; and with the Strategic Planning Committee of P.E.I., concerning land degradation.

Newfoundland:

At the present time there is no soil degradation program in Newfoundland. The need for such a program, and possible approaches if one is needed, will be investigated before the end of the year.

This brief report has not dealt with the many soil degradation studies and projects in which the Soil Survey is not directly involved. They are mainly University based or undertaken by Provincial research or extension personnel. Their contribution to the overall soil degradation assessment and control problem is recognized and valued. Members of the Soil Degradation Working Group can generally provide more details regarding these activities in their provinces.

FORESTRY INTERPRETATIONS WORKING GROUP STATUS REPORT

D.E. Moon

The primary objective of the working group was the completion of "A Manual for Interpreting soils Information for Forestry" under D.E. Moon, Land Resource Research Centre, as editor. Authors have submitted contributions for all but one section of the manual. It was agreed that individual contributors would be identified as authors of their respective sections. All but one major section is complete and the manual is nearly ready for technical edit. An outline of the manual with the authors of each section is given below.

The manual should be ready to go to outside review for technical content next year. Some reviewers, both private and public sector, have been contacted but others will be required. The final publication date will depend on the reaction of the outside reviewers, time available to the editor, and publication priorities in the Centre. Publication before 1989 is unlikely unless priorities are redefined.

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CanSIS COMPUTER WORKING GROUP STATUS REPORT

K. Bruce MacDonald

i. Upgrade of the CanSIS Cartographic System to an ARC/Info System - Chronology of Events.

By November 1985 the hardware and software requirements to upgrade the Ottawa cartographic system had been specified. In addition, regional requirements for Geographic Information System capability had been documented by K. Jones and D. Moon. Subsequently, a cost/benefit study was carried out and the equipment specifications were finalized to the extent that a requisition was submitted April 4, 1986. The requisition received all the necessary checking and approvals within the department by August 1986 and was sent to DSS in September.

ii. Implementation Plan

A detailed implementation plan outlining some 20 tasks required for the successful implementation of ARC/Info has been prepared. It will form the basic framework for the implementation process.

iii. CanSIS Working Group

The CanSIS Working Group has been reconstituted with G. Patterson as the leader. Its mandate is to develop the file format and content for the attribute files to be associated with the cartographic data in CanSIS.

iv. Potential Roles of CanSIS

- Service and national custodial (archive) roles
- National projects; managed by personnel in Ottawa with regional cooperation
- Local projects; managed by regional personnel who take full responsibility for all aspects
- Combination projects; initiated and conducted by regional personnel for applications both local and national. Initially, responsibility and management resides with regional personnel; data are used for local purposes during and immediately after the project, then the responsibility for the data will be transferred to a member of the federal staff.

v. CanSIS Review

A detailed review of the CanSIS project has been completed and submitted to the Director of LRRC. The review has identified two main areas of activity:

(a) the implementation of ARC/Info to a production GIS which encompasses provision of service to the Soil Survey Units and,

(b) the development of specific applications or projects; for example, the generalized soil landscape attribute files and associated data, a national land evaluation system, etc.

- General Direction

The ARC/Info software package will be implemented on a dedicated VAX 11/785 computer over the next two years (by March, 1989). The results of this activity will be that the technical and skill development efforts will be concentrated on the ARC/Info software and VAX technology. Activities on the mainframe IBM computer will be eliminated with the consequence that the file management system will be phased out over the next year (by Sept, 87) and the use of RAPID will be limited to support for Parks Canada. All other files and procedures will be moth-balled or developed on the VAX using the ARC/Info sofware.

- data submission from the regional units will be in machine readable form rather than coded documents to overcome the problems of data quality and editing.

- emphasis on user output formats will be reduced and efforts will be concentrated on standardizing activities to support operational roles.

- the archive role will continue for national data sets and could if required, provide limited storage capability for project data. No support will be available to manipulate project data beyond data storage and copying to user accessible space.

- File Summary

(a) phased-out or mothballed

- Detail file and profile description report
- Wetlands file and reports
- Monitor file and associated soil temperature reports
- Regional files (daily and salinity)
- Soil Names file (current form)
- Performance Management file

(b) Enhanced or developed

- standard attribute files (polygon, mapunit, soil class) in association with the soil maps to serve as the computerized legend
- other files and/or reports as defined in soil survey projects
- soil physical properties file
- site file developed from current DETAIL data
- prairie canola file developed from the P/M file

(c) Potential project areas

- Generalized soil landscape legend and associated files
- Land potential data base
- Land evaluation files and system
- A true site/horizon data file for modelling and baseline monitoring
- Development of Canadian transfer functions

CanSIS COMPUTER WORKING GROUP REPORT

Preliminary Report - G. Patterson

TERMS OF REFERENCE (July 17/86)

1. By 31 Dec. 1986 to propose the attributes, and their classes, that should be recorded for the Polygon, Map Unit and Soil/Nonsoil Names Files of the Cartographic portion of CanSIS.

2. To submit the proposal to K. Valentine and K.B. MacDonald, and to report to the Expert Committee on Soil Survey. A preliminary report will be required in Oct. 1986 and a final report in 1987.

SUPPLEMENTAL TERMS OF REFERENCE

1. The system must be operational within 18 months. Soil attributes to be recorded must be presently available in measured or estimated form. It was unclear as to which maps were to be taken as a reference point -- maps which are:

    a) presently published or
    b) presently published and digitized on the current CanSIS system
    c) about to be digitized on the current CanSIS system or on the ARC/Info system

WORKING GROUP MEMBERSHIP

Regional and interest group representation to the Working Group is as follows:

British Columbia	Dave Moon
Alberta	Tony Brierley
Saskatchewan	Glen Padbury
Manitoba	Walter Fraser
Ontario	Keith Jones
Quebec	Jean Marc Cossette
New Brunswick	Herb Rees
Nova Scotia	Gary Patterson (chairman)
Prince Edward Island	Con Veer
Newfoundland	Ed Woodrow
Yukon	Scott Smith
Modelling	Reinder de Jong
Correlation	Jack Shields

METHODS

Each of the membership was asked to prepare attribute lists applicable to his region or interest group. These lists were submitted to the chairman in September 1986, compiled into a large master list and circulated prior to the Ottawa meetings Oct. 20-22. The intention was to use the meetings to eliminate those attributes which either were not required by user groups or were generally not available.

It became very quickly apparent that the working group required a focus of attention. We chose biological productivity as our primary interpretive need and those investigating biological productivity as our reference user groups.

From the point of view of "first principles", biological productivity is controlled by the availability of energy, water and nutrients. Energy availability is controlled by atmospheric climate and we decided that this is best handled as an overlay rather than as an integral part of the soil map and data base. Plant nutrient supply is manipulated by management, especially in agriculture. We decided not to focus attention on this because it is, for the most part, site specific and not an appropriate national level consideration for soil inventory. The ability of soils to supply water to growing plants therefore became our focal point partly by default and partly because we felt it was an attribute that could be successfully addressed by the Inventory Section of LRRC working in close association with regional counterparts.

The national user groups were identified as those involved in agriculture capability (CLI), soil degradation, irrigation, forest productivity, soil moisture models, land evaluation models, and soil correlation. These groups were viewed to be representative rather than exhaustive.

We decided to focus our immediate attention on presently published and digitized maps. Attributes chosen as "core" must be identified as essential by one or more user groups and be available within 18 months for all records within the data base. Available data are those for which reliable measured results presently exist, or those which can be estimated by qualified pedologists. Mechanisms to differentiate between estimates and repeatedly measured values are included.

Once the focal points were generally accepted, it became rather easy for us to make a list of those attributes that were available and necessary. We then assigned the attributes to various files and discussed how each of the attributes should be recorded.

We emphasize that the attributes listed here are the minimum necessary and available to meet the needs of the identified user groups. In no way do we discourage regions from adding to the list to meet regional goals.

RESULTS

1. The core attribute list is as follows:

Housekeeping, file linkages, etc
Drainage
Depth to watertable
Depth to pore size discontinuity (later abandoned)
Rooting depth
Texture
Organic matter
pH
Base saturation
Cation exchange capacity

Water holding capacity
Saturated hydraulic conductivity
Bulk density
Electrical conductivity
Slope
Selected attributes from the present Soil Names File

2. Four, rather than three files are considered necessary to handle these attributes:

   Soil Names File - contains those attributes pertaining to the whole soil
   Soil Layer File - contains those attributes that vary in the vertical direction
   Soil Map Unit File - translates map unit codes into soil names
   Polygon File - links the soil map unit to a polygon on a map

3. Data will be recorded at its highest level. Slope will be recorded as a most likely value and range rather than as classes. This satisfies the modelling user group and makes it unnecessary to adopt arbitrary class limits that have never been nationally accepted and moreover are subject to change as more data become available.

RECOMMENDATIONS

1. The ARC/Info cartographic files are: Soil Names File, Soil Layer File, Soil Map Unit File and the Polygon File.

2. In order to make maximum use of existing information within the Detail II file, we request that CanSIS service staff generate means and standard deviations by layer (horizon), by soil name, and by province for all attributes listed in the Soil Layer File in PC-DOS ASCII format.

3. The head of the Inventory Section should designate one individual per province to organize the creation of these files.

4. Consideration should be given to allocating funds for the purpose of data entry, data validation and the development of programs to extract attributes embedded within current CanSIS cartographic files (e.g. the "dissection" of the soil map unit symbol into its component parts).

5. Standardization of sampling and analytical methods are necessary to allow inter-regional data comparisons.

6. It is recognized that the Polygon file as described is merely a correspondence table linking a polygon number on a map to a Soil Map Unit Name. Furthermore, the Map Unit File is used exclusively to translate the Soil Map Unit into its component parts. Standardization of the Map Unit Symbol would allow us to make more effective use of these files or to drop the Soil Map Unit File altogether on future maps.

7. Consistency checks should be developed to maintain all files in as clean a state as possible.

THE POLYGON FILE

The purpose of the polygon file is to link polygon numbers to soil map units. For the purpose of this discussion, a soil map unit is the entire symbol found within a polygon drawn on a soil map. One example of a soil map unit is:

soil #1 soil #2

DRT>PGW
1B2

rockiness stoniness
slope

Soil #1 and soil #2 carry information on texture, drainage, mode of origin, depth of rooting, Ksat, plus all the other attributes normally associated with a soil individual. Other nonsoil features such as slope are also recorded but are considered an integral part of the soil map unit.

Another example is:

soil #1 code for associated soil(s)

BZR4
C:R1

slope phase list (like rockiness)

Very similar information is presented here but in a different format. The first example explicity stated the second soil while this map unit symbol uses a code for the same purpose.

Many other examples could be cited but suffice it to say that there exists a core group of attributes that are explicitly part of the map unit symbol of some maps but must be inferred from the symbols of others.

The list of attributes for this file is as follows:

DESCRIPTION: Province of origin for the map
NAME: PROVINCE
TYPE: Integer code
VALUES: as presently defined for Detail II

DESCRIPTION: Map/report number
NAME: MAP
TYPE: Integer code *(should be character?)
VALUES: as defined by region at publication

DESCRIPTION: Polygon Number for the map
NAME: POLYGONNO
TYPE: Positive Integer up to 9999

DESCRIPTION: Map unit name or symbol
NAME: MAPUNITNOM
TYPE: Character
VALUES: as defined by the unique symbol list for the map

DESCRIPTION: Area of the polygon in hectares (ha)
NAME: AREA
TYPE: Positive real number (1 decimal)
COMMENT: Generated by ARC/Info

DESCRIPTION: Perimeter of the polygon in meters
NAME: PERIMETER
TYPE: Positive Integer
COMMENT: Generated by ARC/Info

MAP UNIT FILE

Given nation-wide standardization of the map unit symbol fifty years ago, more information could be extracted directly from the polygon file than is presently the case. Constraints imposed by past published maps virtually dictate that the polygon file be a correspondence table and that the map unit file be used to translate the map symbol into its component parts.

A NOTE TO CORRELATORS: This excercise provides a golden opportunity to update soil name concepts because there could be a Map Unit File for each and every map to be digitized. The PQR map unit on map #38 might consist of the soils ABC and DEF but on map #84 the soils may be XYZ and DEF. This procedure allows for the update of old maps.

The following is a list of attributes to be coded in the Map Unit File:

DESCRIPTION: Province of origin for the map
NAME: PROVINCE
TYPE: Integer code
VALUES: as presently defined for Detail II

DESCRIPTION: Map/report number OR group of maps of the same survey intensity level and map unit style
NAME: MAP_GROUP
TYPE: Integer code
VALUES: as defined by region at publication

DESCRIPTION: Map unit name or symbol
NAME: MAPUNITNOM
TYPE: Character
VALUES: as defined by the unique symbol list for the map

DESCRIPTION: First Soil Code of the Map Unit
NAME: SOIL_CODE1
TYPE: Character (width 3)
VALUES: Must be registered in the Soil Names File

DESCRIPTION: Variant of SOIL_CODE1
NAME: VARIANT1
TYPE: Character (width 2)
VALUES: Must be registered in the Soil Names File

DESCRIPTION: Extent of SOIL_CODE1
NAME: EXTENT1
TYPE: Positive integer
VALUES: (>=3 & <=10)

DESCRIPTION: Second Soil Code of the Map Unit
NAME: SOIL_CODE2
TYPE: Character (width 3)
VALUES: Must be registered in the Soil Names File

DESCRIPTION: Variant of SOIL_CODE2
NAME: VARIANT2
TYPE: Character (width 2)
VALUES: Must be registered in the Soil Names File

DESCRIPTION: Extent of SOIL_CODE2
NAME: EXTENT2
TYPE: Positive integer
VALUES: (>=3 & <=10)

DESCRIPTION: Third Soil Code of the Map Unit
NAME: SOIL_CODE3
TYPE: Character (width 3)
VALUES: Must be registered in the Soil Names File

DESCRIPTION: Variant of SOIL_CODE3
NAME: VARIANT3
TYPE: Character (width 2)
VALUES: Must be registered in the Soil Names File

DESCRIPTION: Extent of SOIL_CODE3
NAME: EXTENT3
TYPE: Positive integer
VALUES: (>=3 & <=10)

DESCRIPTION: Most Likely Slope in Percent
NAME: SLOPE%
TYPE: Positive integer
VALUES: 0 - 150

DESCRIPTION: Lowest Slope in Percent
NAME: SLOPE%_L
TYPE: Positive integer
VALUES: 0 - 150

DESCRIPTION: Highest Slope in Percent
NAME: SLOPE%_H
TYPE: Positive integer
VALUES: 0 - 150

SOIL/NONSOIL NAMES FILE

DESCRIPTION: Province of origin for the map
NAME: PROVINCE
TYPE: Integer code
VALUES: as presently defined for Detail II

DESCRIPTION: Map/report number OR group of maps of the same survey intensity level and map unit style
NAME: MAP_GROUP
TYPE: Integer code
VALUES: as defined by region at publication

DESCRIPTION: Soil/Nonsoil Name
NAME: SOILNAME
TYPE: Character (width 12)
VALUES: As defined by the region but must be nationally unique

DESCRIPTION: Soil/Nonsoil Code
NAME: SOIL_CODE
TYPE: Character (width 3)
VALUES: As defined by the province and must be unique within that province

COMMENT: The issue of nonsoils was not properly addressed during this session. There is a need for a slightly different set of rules for nonsoils. Some of these are:

Perhaps the same name and code may be carried from province to province for nonsoil names liked "gravel pit".

Many attributes listed here apply to soils only and should be automatically excluded for certain nonsoils.

There was some discussion regarding the use of Z as the first letter of nonsoil codes to allow quick sorting and ease of identification. However, at least one province has soils with Z as the first code letter.

DESCRIPTION: Variant of SOIL_CODE
NAME: VARIANT
TYPE: Character (width 2)
VALUES: As defined by the Province

DESCRIPTION: Presence or absence of a watertable in the control section
NAME: WATERTBL
TYPE: Character (width 4)
VALUES:

NO	not present during any part of the year
YU	present during an unspecified time
YGS	present during the growing season
YNGS	present during the non growing season
YB	present during the growing and non growing season

DESCRIPTION: Presence or absence of root restricting layer in the control section
NAME: ROOTRESTRI
TYPE: Positive integer
VALUES: o not present
n layer n (1<=n<=6) of the layer file

DESCRIPTION: Soil Drainage
NAME: DRAINAGE
TYPE: Character (width 2)
VALUES: VR Very Rapidly
R Rapidly
W Well
MW Moderately Well
I Imperfectly
P Poorly
VP Very Poorly

In addition to the list above, most of the attributes of the present Soil Names File will fit in this section. As a group, we realized late on the last day of the session that the Soil Correlators are a legitimate user group requiring the use of the Names File. The National Correlators have been given the task of identifying those fields that they wish to retain.

LAYER FILE

This file is designed to handle those attributes which vary in a vertical direction. Generally speaking, values for this group of attributes have previously been reported as categorical or class values. We recognized this as a tremendous loss of information so we decided to report the mean and standard deviation for each attribute together with the number of observations (0=estimate) and the method of analysis. Two reasons for this decision are:

(1) Class limits have changed over the years and are likely to continue to do so. For some measurements like particle size, there are two currently accepted sets of class limits. Presenting a "most likely value" and a range around that value allows data to be generalized into any set of class limits.

(2) Our major identified user groups require numerical rather than class data. At present, they simply use the mid-point of class data to arrive at the numbers they need. However, the collectors of the information are most familiar with the data and presumably the best qualified to state the most likely value for any given attribute.

These arguments were presented at the Unit Heads Meeting on October 23 and were generally accepted. There was, however, some discussion regarding our Committee's use of the terms "mean" and "standard deviation". It was strongly suggested that we cannot produce these figures for most attributes. A most likely value together with estimates of the highest and lowest values for each attribute would seem more acceptable. This is the way I have designed the file for the time being. Please constructively criticize.

Following is the list produced by the group:

DESCRIPTION: Province of origin for the map
NAME: PROVINCE
TYPE: Integer code
VALUES: as presently defined for Detail II

DESCRIPTION: Map/report number OR group of maps of the same survey intensity level and map unit style
NAME: MAP_GROUP
TYPE: Integer code
VALUES: as defined by region at publication

DESCRIPTION: Soil Code
NAME: SOIL_CODE
TYPE: Character (width 3)
VALUES: As defined by the province and must be unique within that province

DESCRIPTION: Variant of SOIL_CODE
NAME: VARIANT
TYPE: Character (width 2)
VALUES: As defined by the Province

DESCRIPTION: Layer or Horizon Number
NAME: LAYERNO
TYPE: Positive Integer
VALUES: (>=1 & <=6)

DESCRIPTION: Layer/Horizon Name
NAME: LAYERNOM(n)
TYPE: Character
VALUES: blank, or horizon designations of the Canadian System of Soil Classification

DESCRIPTION: Most likely Upper Boundary (cm)
NAME: UDEPTH(n)
TYPE: Signed integer
VALUES: -50 to 160

DESCRIPTION: Highest Upper Boundary (cm)
NAME: UDEPTH_H(n)
TYPE: Signed Integer
VALUES: -50 to 160

DESCRIPTION: Lowest Upper Boundary (cm)
NAME: UDEPTH_L(n)
TYPE: Signed Integer
VALUES: -50 to 160

DESCRIPTION: Most likely Lower Boundary (cm)
NAME: LDEPTH(n)
TYPE: Signed integer
VALUES: -50 to 160

DESCRIPTION: Shallowest Lower Boundary (cm)
NAME: LDEPTH_H(n)
TYPE: Signed Integer
VALUES: -50 to 160

DESCRIPTION: Deepest Lower Boundary (cm)
NAME: LDEPTH_L(n)
TYPE: Signed Integer
VALUES: -50 to 160

DESCRIPTION: Most likely Coarse Fragments (% by volume)
NAME: COARSEFRAG(n)
TYPE: Integer
VALUES: 0 to 100

DESCRIPTION: Lowest Coarse Fragments (% by volume)
NAME: COARSEFRAG_L(n)
TYPE: Integer
VALUES: 0 to 100

DESCRIPTION: Highest Coarse Fragments (% by volume)
NAME: COARSEFRAG_H(n)
TYPE: Integer
VALUES: 0 to 100

DESCRIPTION: Method for Determining Coarse Fragments (% by volume)
NAME: COARSEFRAG_M(n)
TYPE: Character (width 1)
VALUES: E Estimate
S Sieving

DESCRIPTION: Dominant Sand Fraction if Total Sand >50%
NAME: DOMSAND
TYPE: Character (width 2)
VALUES: VC Very Coarse
C Coarse
M Medium
F Fine
VF Very Fine

DESCRIPTION: Most likely Very Fine Sand (% by weight)
NAME: VFSAND(n)
TYPE: Integer
VALUES: 0 to 100

DESCRIPTION: Lowest Very Fine Sand (% by weight)
NAME: VFSAND_L(n)
TYPE: Integer
VALUES: 0 to 100

```
DESCRIPTION:  Highest Very Fine Sand (% by weight)
NAME:  VFSAND_H(n)
TYPE:  Character (width 1)
VALUES:  0 to 100

DESCRIPTION:  Method for Determining Very Fine Sand (% by weight)
NAME:  VFSAND_M(n)
TYPE:  Character (width 1)
VALUES:  E    Estimate
         S    Sieving

DESCRIPTION:  Most likely Total Sand (% by weight)
NAME:  TSAND(n)
TYPE:  Integer
VALUES:  0 to 100

DESCRIPTION:  Lowest Total Sand (% by weight)
NAME:  TSAND_L(n)
TYPE:  Integer
VALUES:  0 to 100

DESCRIPTION:  Highest Total Sand (% by weight)
NAME:  TSAND_H(n)
TYPE:  Integer
VALUES:  0 to 100

DESCRIPTION:  Method for Determining Total Sand (% by weight)
NAME:  TSAND_M(n)
TYPE:  Character (width 1)
VALUES:  E  Estimate
         S  Sieving

DESCRIPTION:  Most likely Total Silt (% by weight)
NAME:  TSILT(n)
TYPE:  Integer
VALUES:  0 to 100

DESCRIPTION:  Lowest Total Silt (% by weight)
NAME:  TSILT_L(n)
TYPE:  Integer
VALUES:  0 to 100

DESCRIPTION:  Highest Total Silt (% by weight)
NAME:  TSILT_H(n)
TYPE:  Integer
VALUES:  0 to 100

DESCRIPTION:  Most likely Total Clay (% by weight)
NAME:  TCLAY(n)
TYPE:  Integer
VALUES:  0 to 100
```

```
DESCRIPTION:  Lowest Total Clay (% by weight)
NAME:  TCLAY_L(n)
TYPE:  Integer
VALUES:  0 to 100

DESCRIPTION:  Highest Total Clay (% by weight)
NAME:  TCLAY_H(n)
TYPE:  Integer
VALUES:  0 to 100

DESCRIPTION:  Method for Determining Total Clay (% by weight)
NAME:  TCLAY_M(n)
TYPE:  Character (width 1)
VALUES:  E  Estimate
         H  Hydrometer unspecified
         H  Hydrometer etc.
         P  Pipette

DESCRIPTION:  Most likely Organic Carbon (% by weight)
NAME:  ORGCARBON(n)
TYPE:  Integer
VALUES:  0 to 65

DESCRIPTION:  Lowest Organic Carbon (% by weight)
NAME:  ORGCARBON_L(n)
TYPE:  Integer
VALUES:  0 to 65

DESCRIPTION:  Highest Organic Carbon (% by weight)
NAME:  ORGCARBON_H(n)
TYPE:  Integer
VALUES:  0 to 65

DESCRIPTION:  Method for determining Organic Carbon (% by weight)
NAME:  ORGCARBON_M(n)
TYPE:  Character (width 1)
VALUES:  E  Estimate
         W  Walkley-Black
         L  Loss on Ignition

DESCRIPTION:  Most likely pH in CaCL2
NAME:  PH_CA(n)
TYPE:  Integer
VALUES:  0 to 14

DESCRIPTION:  Lowest pH in CaCL2
NAME:  PH_CA_L(n)
TYPE:  Integer
VALUES:  0 to 14

DESCRIPTION:  Highest pH in CaCL2
NAME:  PH_CA_H(n)
TYPE:  Integer
VALUES:  0 to 14
```

```
DESCRIPTION:  Most likely pH (second method)
NAME:  PH2(n)
TYPE:  Integer
VALUES:  0 to 14

DESCRIPTION:  Lowest pH (second method)
NAME:  PH2_L(n)
TYPE:  Integer
VALUES:  0 to 14

DESCRIPTION:  Highest pH (second method)
NAME:  PH2_H(n)
TYPE:  Integer
VALUES:  0 to 14

DESCRIPTION:  Method for Determining pH (second method)
NAME:  PH2_M(n)
TYPE:  Character (width 1)
VALUES:  E  Estimate
         W  Water

DESCRIPTION:  Most likely Base Saturation
NAME:  BASES(n)
TYPE:  Integer
VALUES:  0 to 100

DESCRIPTION:  Lowest Base Saturation
NAME:  BASES_L(n)
TYPE:  Integer
VALUES:  0 to 100

DESCRIPTION:  Highest Base Saturation
NAME:  BASES_H(n)
TYPE:  Integer
VALUES:  0 to 100

DESCRIPTION:  Method for Determining Base Saturation
NAME:  BASES_M(n)
TYPE:  Character (width 1)
VALUES:  E  Estimate

DESCRIPTION:  Most likely Cation Exchange Capacity
NAME:  CEC(n)
TYPE:  Integer
VALUES:  0 to 100

DESCRIPTION:  Lowest Cation Exchange Capacity
NAME:  CEC_L(n)
TYPE:  Integer
VALUES:  0 to 100

DESCRIPTION:  Highest Cation Exchange Capacity
NAME:  CEC_H(n)
TYPE:  Integer
VALUES:  0 to 100
```

DESCRIPTION: Method for Determining Cation Exchange Capacity
NAME: CEC_M(n)
TYPE: Character (width 1)
VALUES: E Estimate
. .....

DESCRIPTION: Most likely Moisture Retention (% by volume @ OkPa)
NAME: KP_O(n)
TYPE: Integer
VALUES: 0 to 100

DESCRIPTION: Lowest Moisture Retention (% by volume @ OkPa)
NAME: KP_OL(n)
TYPE: Integer
VALUES: 0 to 100

DESCRIPTION: Highest Moisture Retention (% by volume @ OkPa)
NAME: KP_OH(n)
TYPE: Integer
VALUES: 0 to 100

DESCRIPTION: Method for Determining Moisture Retention (% by volume @ OkPa)
NAME: KP_OM(n)
TYPE: Character (width 1)
VALUES: E Estimate
. .....

DESCRIPTION: Most likely Moisture Retention (% by volume @ 10kPa)
NAME: KP_10(n)
TYPE: Integer
VALUES: 0 to 100

DESCRIPTION: Lowest Moisture Retention (% by volume @ 10kPa)
NAME: KP_10L(n)
TYPE: Integer
VALUES: 0 to 100

DESCRIPTION: Highest Moisture Retention (% by volume @ 10kPa)
NAME: KP_10H(n)
TYPE: Integer
VALUES: 0 to 100

DESCRIPTION: Method for Determining Moisture Retention (% by volume @ 10kPa)
NAME: KP_10M(n)
TYPE: Character (width 1)
VALUES: E Estimate

DESCRIPTION: Most likely Moisture Retention (% by volume @ 1500 kPa)
NAME: KP_1500(n)
TYPE: Integer
VALUES: 0 to 100

DESCRIPTION: Lowest Moisture Retention (% by volume @ 1500 kPa)
NAME: KP_1500L(n)
TYPE: Integer
VALUES: 0 to 100

DESCRIPTION: Highest Moisture Retention (% by volume @ 1500 kPa)
NAME: KP_1500H(n)
TYPE: Integer
VALUES: 0 to 100

DESCRIPTION: Method for Determining Moisture Retention (% by volume @ 1500 kPa).
NAME: KP_1500M(n)
TYPE: Character (width 1)
VALUES: E Estimate
. .....

DESCRIPTION: Most likely Bulk Density
NAME: BD(n)
TYPE: Integer
VALUES: 0 to 100

DESCRIPTION: Lowest Bulk Density
NAME: BD_L(n)
TYPE: Integer
VALUES: 0 to 100

DESCRIPTION: Highest Bulk Density
NAME: BD_H(n)
TYPE: Integer
VALUES: 0 to 100

DESCRIPTION: Method for Determining Bulk Density
NAME: BD_M(n)
TYPE: Character (width 1)
VALUES: E Estimate
. .....

DESCRIPTION: Most likely Electrical Conductivity
NAME: EC(n)
TYPE: Integer
VALUES: 0 to 100

DESCRIPTION: Lowest Electrical Conductivity
NAME: EC_L(n)
TYPE: Integer
VALUES: 0 to 100

DESCRIPTION: Highest Electrical Conductivity
NAME: EC_H(n)
TYPE: Integer
VALUES: 0 to 100

DESCRIPTION: Method for Determining Electrical Conductivity
NAME: EC_M(n)
TYPE: Character (width 1)
VALUES: E Estimate
. .....

IRRIGATION SUITABILITY CLASSIFICATION WORKING GROUP STATUS REPORT

R.G. Eilers, Chairman

An initial report of this working group is published in the ECSS Proceedings, 1984. In 1985 the chairman presented a report to the Fourth Annual Western Provincial Conference, Rationalization of Water and Soil Research and Management, Saskatoon, Saskatchewan (see Proc., Nov., 1985).

The manuscript was subsequently revised and was distributed to working group members in September, 1986 for final edit. The publication of:

> "An Irrigation Suitability Classification System for the Canadian Prairies"

is anticipated for 1987. At this time, I would like to acknowledge the members of the working group who provided invaluable support and many constructive suggestions:

J. Ellis	- S.I.P., Saskatoon
D. Anderson	- S.I.P., Saskatoon
A. Bristol	- Sask. Dept. of Agriculture
W. Nicholiachuk	- NHRI, Environment Canada, Saskatoon
L. Chambers	- PFRA, Regina
C. Arshad	- Res. Br., formerly PFRA
B. Harron	- PFRA, Regina
W. Pettapiece	- A.I.P., Edmonton
K. Pohjakas	- Alberta Agric., Lethbridge

SWIG (SOIL WATER INTEREST GROUP) WORKING GROUP STATUS REPORT

R.G. Eilers, Chairman

In 1981 (ECSS Proc.) SWIG recommended that the new criteria for describing soil water regimes should be adopted and tested for a period of 5 years, after which time it would be reevaluated and further recommendations made as to its modification and implementation. According to that schedule, 1986 would have been the evaluation year. Since progress has been slower than originally projected, only a preliminary assessment can be made at this time.

The following recommended SWIG activities remain more or less outstanding at this time:

1. Investigate the feasibility of integrating cryosolic soils into the soil water classification scheme (ECSS Proc. 1981).

   A "SWAB" site was established in the zone of discontinuous permafrost near Thompson, Manitoba (see preliminary report by Mills, Eilers and Veldhuis - ECSS Proc. 1984). Monitoring has continued at this site to date. Data awaits further evaluation.

   Discussions were initiated with members of SWIG and the respective chairmen of the Working Groups on Soil Climate and Soil Taxonomy to consider methods of applying SWIG to the cryosolic soils. The following "ground" rules were agreed upon as a starting point for applying SWIG criteria to the moisture regimes of cryosols.

   a) Depth to saturated soil zone (water table) is an important feature of cryosols.

      At the present time the depth to water table classes in SWIG are inappropriate for application to cryosols with permafrost tables. A proposal was made to consider subdividing H1 (0-50 cm) class to accommodate soils with permafrost in the control section.

      Classes proposed:

H1	0-20	Extremely High
H2	20-50	Very High
H3	50-100	Moderately High

      These class limits have precedence, at the soil family level in the Soil Taxonomy, as depth criteria for application to soils of the Cryosolic Order (Cdn. System of Soil Classification 1978, p. 120). The suitability of these classes for describing depth to water tables in cryosolic soils will be evaluated against accumulating data from northern Manitoba, the Yukon, and the Northwest Territories.

      The applicability of these narrower classes to non-cryosolic mineral soils with indurated and hardpan or compacted layers could also be reviewed.

   b) The depth class for water tables would apply only if free water was observed and measured. The permafrost table would <u>not</u> be considered to be a frozen water table.

c) Persistence classes for water tables in cryosols could be accomodated within the classes presently proposed by SWIG. The persistence classes would be applicable to the period of time when the surface soils are not frozen.

2. Integration of SWIG with soil climate and soil taxonomy (ECSS Proc. 1984).

The relationship between soil thermal regimes and soil water regimes is inadequately defined for cryosolic soils and poorly defined for many non-cryosolic soils, particularly for the early part of the growing season. The continuity and persistence of frost lenses maintain excess surface water and restrict internal drainage of many soils. This delay is sufficient, in some cases, to preclude seeding of certain crops. This becomes a concern for land evaluation, crop recommendations and assessment of drainage requirements and necessitates that soil types susceptible to these moisture and thermal conditions be identified.

Although frost lensing was recognized as an important soil condition by several working group members, no proposals for accomodating this problem were forthcoming at this time. Knowledge of the thermal regime and related spring thaw pattern of such soils could be used to identify the occurrence and persistence of an ice perched water table condition.

3. Revisions to SWIMM (ECSS Proc. 1984).

I have simply not had time to revise the first draft of SWIMM, 1982 (Soil Water Investigation Methods Manual). It has been distributed in its present form on several occasions to individuals planning soil water monitoring activities.

I believe there is a more urgent need for SWIMM presently developing. More monitoring activities are currently being initiated to evaluate the impact of management practices on soil degradation, in particular soil salinization.

The update and revision of SWIMM will require the concerted efforts of several people. Due to current commitments, it seems highly unlikely that I will be able to devote a sufficient block of time to this task. However, I would estimate the time requirement for the update and revisions to be approximately 3 months with appropriate support and input from all SWIG members.

Presently SWIMM (1982) is a collation of methods of measuring and estimating soil water properties. It is not in the form of a handbook or guide.

4. Automation of Monitoring at SWAB (ECSS Proc. 1984).

With the exception of the use of some automatic water level recorders, little progress has been made in establishing benchmark sites with automated monitoring equipment. No deluxe SWABS (Soil Water Benchmark Sites) have been established by soil survey units specifically for the purpose of evaluating SWIG. However, universities and provincial

agencies in several provinces (e.g. Saskatchewan and Alberta) have established research sites for the purpose of investigating local hydrology, erosion and salinity. The application of this research to soil survey requirements is, for the most part, indirect.

5. Evaluation of SWIG Criteria

Since 1981 numerous proposals and revisions have been made to the SWIG criteria, and are reported in two references (see CanSIS Manual for Describing Soils in the Field 1982, and numerous ECSS Proceedings since 1981). A complete listing of the criteria presently proposed for describing the water regimes for Canadian soils is given in Table 1.

For the most part all soil survey units continue to use the old soil drainage designations. The Maritime units remain the leaders in the day-to-day use of the newer criteria proposed by SWIG. It is clear from the range of properties listed in Table 1 that not all of the criteria will be utilized for any given area. This simply reflects the wide diversity of environments at the national level.

A brief synopsis by province follows:

Newfoundland
- uses the old drainage designations on a routine basis
- beginning to apply SWIG criteria to detailed soil descriptions
- H category (depth to layer of increased porosity), Table 1, is the least used of all the criteria
- the list of man-made modifiers are not generally appropriate because there is very little drainage of mineral soils
- the depth at which lateral seepage occurs would be more useful information

Nova Scotia
- utilizes both the old drainage designations as well as some of the SWIG criteria
- most commonly used criteria are soil drainage class followed by hydraulic conductivity and depth to impeding layer
- least commonly used criteria are aridity followed by persistence and saturated zone
- except for the gravelly and sandy soils, aridity has never been considered because of the humid climate

Prince Edward Island
- generally uses the soil drainage designations
- aridity classes are used the least often
- with the exception of the aridity classes and some of the persistence classes, the criteria are generally appropriate for P.E.I.

Table 1. Criteria for Describing Soil Water Regimes in Canadian Soils as Proposed by the ECSS Working Group on Soil Water (SWIG)[1]

A. Soil Drainage

VR	Very Rapid
R	Rapid
W	Well
MW	Moderately Well
I	Imperfect
P	Poor
VP	Very Poor

B. Aridity (mm)

1	<100
2	100-149
3	150-199
4	200-249
5	250-299
6	300-349
7	350-399
8	400-449
9	450-499
10	500-549
11	550-600
12	>600

C. Hydraulic Conductivity (cm/hr)[2]

H	High	>15
H2	Very Rapid	>50
H1	Rapid	15-50
M	Medium	0.5-15
M3	Mod-Rapid	5-15
M2	Moderate	1.5-5
M1	Mod-Slow	0.5-1.5
L	Low	<0.5
L3	Slow	0.15-0.5
L2	Very Slow	0.05-0.15
L1	Extr. Slow	<0.05

D. Saturated Zone (cm)

H	High	<100
H1	Very High	0-50[3]
H2	Mod. High	50-100
M	Medium	100-200
M1	Medium High	100-150
M2	Generally Low	>150
M3	Medium Low	150-200
L	Low	>200
L1	Mod. Low	200-300
L2	Very Low	>300

Average annual least depth
Average annual greatest depth

E. Persistence - Duration of Least Depth (days)

S	Short	2-20
S1		2-10
S2		10-20
M	Medium	20-60
M1		20-40
M2		40-60
P	Prolonged	>60
P1		60-120
P2		120-240
P3		>240

Applicable to either seasonal (S) or annual (A) calculations

F. Seepage

E	Enriching
N	Neutral
D	Deleterious

G. Impeding Layers Depth To (cm) (reduced porosity)

A1	20-50
A2	50-100
A3	100-150
A4	150-200

H. (Increased Porosity)

B1	20-50
B2	50-100
B3	100-150
B4	150-200

I. Man-Made Modifiers

D	ditched, minor effect
DD	ditched, major effect
T	tube drained, minor effect
TT	tube drained, major effect
M	mole drained, minor effect
MM	mole drained, major effect
S	subsoiled, minor effect
SS	subsoiled, major effect
R	ridged, listed, minor effect
RR	ridged, listed, major effect
I	irrigated, minor effect
II	irrigated, major effect
X	raised water level, minor effect
XX	raised water level, major effect

[1] See ECSS Proc., 1981, p.64 for rationale
[2] For data publication convert units to (m/S)
[3] Class limits currently under evaluation for application to cryosols

New Brunswick
- SWIG criteria used most often:
  A. Soil Drainage
  C. Hydraulic Conductivity
  D. Saturated Zone
  E. Persistence
  G. Impeding Layers Depth To
  Most difficulty occurs in trying to assign persistence classes
- SWIG criteria used least often
  F. Seepage
  H. Increased Porosity
  I. Man-Made Modifiers
- Aridity classes are generally not appropriate due to the humid to perhumid climates. However, under some conditions such as coarse textured soils and shallow available rooting zones due to subsoil compaction, water deficits are a problem.
- Two aspects should receive additional attention:
  a) the extensiveness and impact of frost lenses
  b) moisture deficits - duration and severity (most deficits are peak events but are still very critical to crop production)

Quebec
- no water table sites have been established by the Soil Survey
- joint project between Agmet (LRRC) and Laval University to monitor soil temperature and water table conditions in St. Hyacinth County near Montreal; inlcudes 4 detailed sites and 9 complementary sites, also monitoring aerial climate, variety of crops included.
- do not like to use the old soil drainage designations
- prefer to describe drainage in terms of surface drainage (runoff) and vertical drainage (K_vSat)
- attempting to apply guideline proposed by McKeague et al. (1982) and Wang et al. (1985) to estimate hydraulic conductivity
- support the need for more applied research and interpretation of soil morphology for assessing soil water regimes

Ontario
- continue to monitor water tables in soil survey areas
- published water table data for 49 observation wells in 3 counties
  Hohner, B.K. and Presant, T. 1985. Seasonal fluctuations of apparent water tables in selected soils in the regional municipalities of Niagara and Haldimand-Norfolk between 1978 and 1984. Ontario Institute of Pedology.
  This report summarzies the results of 5 to 6 years of water table monitoring; unfortunately, however, the report makes no attempt to interpret the data in terms of evaluating the appropriateness of the proposed SWIG criteria.

Manitoba
- monitoring sites for water table and soil temperatures being maintained
- 50 additional sites being monitored for water table and salinity in both soil and groundwater
- water tables and soil temperatures being monitored in discontinuous permafrost zone for purposes of characterizing a typical wetland and to study cryosolic soil characteristics

- SWIG criteria has been added to daily field file
- criteria most commonly recorded include:
  - Soil Drainage
  - Saturated Zone
  - Seepage
  - Hydraulic Conductivity (estimated)
- least commonly recorded criteria:
  - Aridity (time dependent variables difficult to
  - Persistence estimate from one-time observations)
  - Impeding Layers Depth To (unless it is bedrock)
  - Man-Made Modifiers

Saskatchewan, Alberta and British Columbia

- monitoring of water tables and water quality not presently part of soil survey activities
- some monitoring of soil water regimes being done as research projects by Depts. of Soil Science
- most commonly used criteria:
  - Soil Drainage
  - Saturated Zone if observed in soil inspections

Yukon

- most commonly used criteria:
  - Drainage Class
  - Estimates of K Sat
  - Seepage
  - Impeding Layers
- least commonly used criteria:
  - Aridity
  - Saturated Zone
  - Persistence
  - Porosity
  - Man-Made modifiers
- some workers have used the term "frost gleying" referring to the effect of persistent and slowly degrading seasonal frost (and/or deep active layers) in cold soils or cryosols

In terms of new or additional criteria, several members of SWIG suggested that the continuity and persistence of seasonal frost lensing in non-cryosolic soils should be documented. Frost lensing temporarily restricts internal soil drainage which can result in reduced work days and effectively reduces length of the growing season. This requires an obvious integration of both the SWIG and Soil Climate W.G.'s as previously mentioned.

There was also an expressed need to develop example applications and interpretations for the utilization of SWIG criteria.

A review of the progress of the last 5 years indicates that the adoption and utilization of new methods of characterizing soil water regimes has been very slow and gradual, even though there is wide support for more quantitative assessments of soil water. If further progress is to be made in the promotion, adoption and utilization of new criteria and procedures, more field demonstrations should be conducted to remove some of the "mystique" and reluctance to making these measurements or estimates. This is exemplified by

the work of McKeague et al., 1982 and Wang et al., 1985 in LRRC and by Watt et al. (in prep.) in New Zealand.

By the way of additional information - Mr. Jim Watt of the New Zealand Soil Bureau is in the process of compiling a national handbook for the major soils of New Zealand which summarizes the results of their "SWAMP" (Soil Water Assessment and Measurement Program) activities over the past 4 years. They have also developed some reasonably simple, objective techniques for estimating soil permeability and hydraulic conductivity which may have ready application to Canada.

References

McKeague, J.A., C. Wang and G.C. Topp. 1982. Estimating saturated hydraulic conductivity from soil morphology. Soil Sci. Soc. Am. J. 46:1239-1244.

Wang, C., J.A. McKeague and G.C. Topp. 1985. Comparison of estimated and measured horizontal K Sat. values. Can. J. Soil Sci. 65:707-715.

SWIG Recommendations

1. In the interest of making more progress in the development of a field guide or handbook for conducting soil water investigations (SWIMM), SWIG recommends that ECSS provide a more formal commitment to the task of completing SWIMM, possibly as a project through LRRC (Ottawa) where it could be more officially handled, thus ensuring a more timely completion of the task.

2. In the interest of promoting the use and adoption of SWIG criteria by each soil survey unit, SWIG recommends that LRRC sponsor more field workshops for the purpose of demonstrating methods for measuring and estimating SWIG parameters, and developing practical examples for interpretation and application of SWIG data.

SOIL SALINITY WORKING GROUP STATUS REPORT

R.G. Eilers, Chairman

Initial report in ECSS Proc., 1984. Subsequently a report entitled:

"Guidelines and Criteria for Describing, Classifying and Mapping Saline Soils" (Jan., 1985).

was prepared for the working group. The results of this report have been used as the basis for developing small scale provincial maps of soil salinity (1:1M scale) utilizing the generalized soil landscapes map as the base. In addition, this report provided some initial guidelines for the development of a strategy for monitoring soil salinity.

The compilation of the small scale salinity maps has been completed for Manitoba and Saskatchewan. The map for Alberta is currently being compiled. Inter-provincial correlation as well as final content and formatting of the legend are currently in progress. All maps will be complete to publication stage in early 1987.

Acknowledgements are extended to members of the working group which included:

W. Pettapiece*
K. Pohjakas
W. Nicholiachuk
J. Ellis
W. Eilers*
C. Arshad
L. Chambers
R.G. Eilers*

---

* Provincial contacts for compilation of small scale salinity maps

STATUS REPORT OF THE SOIL SALINITY TASK FORCE ON "CRITICAL" NEEDS FOR RESEARCH INTO DRYLAND SOIL SALINITY ON THE PRAIRIES

R.G. Eilers, Chairman

The Task Force on Soil Salinity was established in 1985, in response to a request from the Associate Committee on Hydrology for a state-of-the-art review paper on research needs in dryland soil salinity.

The objective for the T.F. was to determine the type and priority of research required as perceived by researchers and other individuals involved in various aspects of soil salinity.

The first step was to conduct a poll-type survey of researchers and others interested in salinity research. The questionnaire approach followed a technique known as the "Delphi Process" (Hunt and Brooks, 1982). The Delphi Process consists of a series of questionnaires which are developed by and distributed to a defined group of individuals. The Delphi Process relies on the informed judgement of these individuals with regard to topics or issues for which reliable objective data are difficult to obtain. The process includes the use of controlled feedback to the respondents, and the use of the questionnaire results for reevaluation and re-ranking. The final results thus reflect a more carefully considered group response as well as a greater consensus as to the nature and priority of research needs.

The following statements summarize the results of the questionnaires and pertain to the prairie region as a whole:

1. Soil salinity is widely recognized as a water management problem. High emphasis was given to topics related to controlling recharge and discharge.

2. The emphasis on water management should focus on improving farming practices, that is, methods of water control through appropriate crop selection and maintenance as opposed to artificial drainage (i.e. tiles).

   Low priority was given to topics related to tile drainage, whereas high priority was assigned to topics related to development and selection of water efficient crops tolerant to salinity.

3. Improved public awareness is required to improve the recognition and management of soils affected by dryland salinity.

   Technology transfer was rated high in each province. This included establishment of practical field demonstrations of known technology and the establishment of farmer associations oriented towards salinity control. This statement recognizes the fact that the magnitude of many salinity problems extends well beyond the control of individual farmers.

4. Basic research is still required to investigate soil-salt-water-plant relationships to improve our understanding of the natural processes involved and to facilitate the development and application of effective control measures.

Geohydrology of salinized soils, improved field techniques for identifying, measuring and mapping salinity, and numerous topics related to investigating salt and water flux phenomena within the soil were generally rated high to medium high.

The top 10 research topics identified for the prairie region are as follows:

1. Establish practical field demonstration projects to show accepted salinity control mechanisms.

2. Management practices to reduce recharge.

3. Establish improved techniques to determine existing and potential recharge/discharge areas.

4. Encourage the development and farmer operation of dryland salinity control associations.

5. Impact of cropping practices on water table control.

6. Broaden the approach to public and government education about salinity causes and controls.

7. Crop/soil/climatic conditions that affect dryland recharge.

8. An integrated approach to reduce summerfallow recharge and facilitate affected area cropping.

9. Distribution variability and seasonal fluctuation of salts within affected areas.

10. Rate of salinity change within affected areas.

A final report is in preparation for submission to the Associate Committee on Hydrology.

Acknowledgements are extended to the following as members of the Task Force:

Dr. M.J. Hendry - Alberta Agriculture
Dr. W. Nicholiachuk - NHRI, Saskatoon
Dr. E. DeJong - U of S
Mr. B. Harron - PFRA
Dr. C. Topp - LRRC

Reference:

Hunt, S.L. and K.W. Brooks. 1982. The Delphi Technique. An alternative to haphazard selection of topics for research. World Future Society Bulletin. (Authors' Address: Seaton Building, University of Kentucky, Lexington, Kentucky 40506, U.S.A.).

SOIL SURVEY HANDBOOK

G.M. Coen

INTRODUCTION

Over 50 interim copies of the English version of the Soil Survey Handbook Vol. 1, Sections 100 through 400, have been distributed to interested pedologists. Periodic requests for copies indicate that there is an interest in the material. There should soon be 500 copies available in English and French which will allow wide distribution and thorough testing of the recommended procedures. I am prepared to receive and compile suggestions for changes, additions or corrections. Please, if you disagree with the recommendations in the Soil Survey Handbook, document your concerns and work to correct the problem; don't ignore it.

ACCOMPLISHMENTS

1. Soil Survey Handbook Vol. 1, Sections 100 through 400 have been prepared camera ready and submitted for printing. It has been translated into French and both language versions should be available soon.

2. The manuscript for Section 600 was completed and distributed to the Editorial Lead Committee for review. Comments have been received from several of the Committee members.

3. Once the Manual for the Interpretation of Land Resource Surveys for Forestry is finished and a consensus on Agronomic Interpretations is reached it should be possible to stimulate activity on Section 500 and perhaps Section 700.

COMMENTS

Since the last ECSS meeting is has become increasingly difficult to make much progress on the Soil Survey Handbook. I don't feel this is because the need has diminished, but rather more urgent day to day needs have diluted the effort. So, like the farmer, who, while building a hay shed finds he must interrupt his labor to bail the hay, we must continue to construct our framework whenever more pressing operational needs allow us to do so.

I am optimistic that a widespread distribution of Sections 100 through 400 will enhance the interest in the SSH and encourage the continued documentation of our procedures as they evolve and become more standardized.

RECOMMENDATIONS

1. That Section 600 be completed and published as a companion document to Vol. 1 (Sections 100-400).

2. That as segments of Sections 500 and 700 become completed they should be evaluated by The Editorial Lead Committee and, if deemed appropriate, printed as supplements to the SSH and distributed for testing.

DATA QUALITY CONTROL FOR SOIL SURVEY LABORATORIES

C. Wang

The two major sources of error that affect the usefulness of soil survey laboratory data are: 1) biased soil samples; and 2) poor quality control in the analytical laboratory. This report is strictly dealing with the latter.

The data generated from various soil survey laboratories (labs that analyze soil samples for inventory purposes) are being used among others for soil classification, soil correlation, and soil interpretation. In most cases, the data also are stored in data files which are accessible to many users. The usefulness of most soil survey reports are largely dependent on the quality of the collected data. It is, therefore, important to have adequate built-in control procedures for every soil survey laboratory.

Nearly all soil survey laboratories now in operation have various kinds of built-in quality control procedures. Many of them, however, are inadequate and/or inconsistently executed. These result in poor quality and inconsistent laboratory data. To complicate the situation even further, nearly every lab has its own lab manual. The details of the analytical methods usually vary from lab to lab. This results in incompatible data among labs. The lack of adequate quality control procedures and the use of different methods for the same determination have caused many difficulties in comparison of data among labs. As a result, the soil classification, correlation interpretation, as well as the credibility of soil survey reports, all suffer.

What can we do to solve the above mentioned problems? I would strongly recommend all soil survey laboratories to do the following:

1. Adopt an adequate quality control procedure and execute it consistently. There are many adequate quality control procedures available. In a recent publication, Sheldrick (1986) mentioned a number of these procedures and described in great detail the one currently being used in the service laboratory of Land Resource Research Centre (LRRC). Copies of this publication are available upon request. You should address your request directly to Mr. Sheldrick (LRRC) or to me.
2. Adopt a common soil analysis manual for all soil survey labs. This will make the analytical data more compatible among labs. I would recommend all labs using the manual edited by McKeague (1978). There is a more recent manual (Sheldrick, 1984) available. Sheldrick's manual, however, is limited to the methods used in the LRRC service lab and nearly all these methods are also available in the McKeague manual. McKeague's manual is published by Can. Soc. of Soil Sci. (Suite 907, 151 Slater St., Ottawa, K1P 5H4, cost $15.00 Can.). Sheldrick's manual is free upon request. Please direct your request directly to Mr. Sheldrick (LRRC).
3. Use reference soil samples. The use of reference soil samples is very important because it provides common ground for comparison among laboratories. This in turn, will provide information about the compatibility of the analytical data among participating labs. This will also provide information to some laboratories for the need of examining and correcting some of their errors in analytical procedures which would otherwise go unnoticed.

The need of reference samples among Canadian soil labs was demonstrated in the early 1970's (Webber et al., 1974). As a result, 28 reference soil samples across Canada were collected, characterized and distributed in the mid 1970's to all soil labs that were interested in reference samples (McKeague et al., 1978). The use of reference soil samples for quality control is common in several soil labs but many more soil labs do not use reference samples. Over the years, the supply of the 28 CSSC reference samples has been exhausted. The need for a new set of reference samples is evident. Since most of the labs used only a few reference samples for quality control, we decided to sample only 8 samples to replace the set of 28 reference samples we had. In selecting these 8 reference samples (Table 1), we tried to cover a wide range of some most commonly determined soil properties such as texture, pH, organic carbon, carbonates, extractable Fe, Al and Si, exchangeable cations, etc. The 8 samples also cover all major soil horizons. In order to have the samples last for decades, at least 200 kg for each sample were collected and they are now ready for distribution. It is important that all soil survey labs (and soil labs in general) use these reference samples and feed back the analytical data to me. From time to time I will summarize the data and send summaries to all participants.

I would ask each soil survey unit head to identify for me the contact person or persons in his province who would have an interest in using these new set of soil reference samples. I will mail a set of samples to them. A set of organic soil reference samples is also available for distribution. Your request for the set of organic soil reference samples should be directed to Dave Kroetsch (LRRC). Please do make sure that the adequate quality control procedure is consistently used in your lab or in the lab that analyzes your samples. The credibility of soil survey is at risk.

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ACKNOWLEDGEMENT

I am grateful to the following persons for collecting the reference soil samples: C. Veer (P.E.I.); J.M. Cossette (Que.); B. Dow (Ont.); P. Haluschak and R.G. Eilers (Man.); G.M. Coen (Alta.).

Table 1

General soil information for Expert Committee on Soil Survey (ECSS) reference soil samples*.

Sample No.	Soil Horizon	Field Texture	Great Group
ECSS 1	C	vfsl	Humo-Ferric Podzol
ECSS 2	Bhf	sl	Ferro-Humic Podzol
ECSS 3	C	c	Humic Gleysol
ECSS 4	Ck	sl	Gray Brown Luvisol
ECSS 5	Ah	l	Melanic Brunisol
ECSS 6	Bm	lfs	Dystric Brunisol
ECSS 7	Ah	cl	Black
ECSS 8	Bnt	l	Solonetz

* Reference soil samples are available upon request. Address to C. Wang, Land Resource Research Centre, Central Experimental Farm, Ottawa, K1A 0C6.

MAPPING SYSTEMS WORKING GROUP STATUS REPORT

K. Valentine, Chairman

There has been little activity as a group since the last meeting at Guelph. Work has been completed or, in effect, taken over by others. There were four topics outstanding after Guelph, and the progress achieved, or their current status is as follows:

1. Specification for Survey Intensity Level: More than fifty replies to a questionnaire about survey procedures were incorporated into a paper published by the chairman with help from summer students (C.J.S.S., 1985, 65:543-553). This includes specifications for all five intensity levels and a recommended formula that can be used for allocating a survey to a particular level.

2. Procedures for SIL2 Survey for Agriculture: After the first Mapping System Report which was largely theoretical, the logical next step appeared to be a series of precise specifications for survey procedures at each level, starting with an SIL 2 survey for Agriculture. However, little formal progress has been made and the work may be translated into a formal project of Land Resource Research Centre Soil Survey Units.

3. Minimum Data Sets: Again there has been much discussion but little formal progress. On the other hand this topic will probably be taken over by the CanSIS/Computer Working Group that has been given the task of recommending a revised file structure and content for CanSIS when it is converted to the commercial ARC/INFO software.

4. Information Packaging: Some recommendations were made by Charles Tarnocai after a number of consultations. There were to be four types of reports of varying degrees of completeness and sophistication; Open File, Report, Bulletin, and Memoir. They were never formally adopted, but the Correlation unit of LRRC will pursue the topic in the interest of reducing the time required for publication. The possibility of devising much data straight from INFO files should also be explored.

The Working Group feels that it has completed the job it was originally given, and others are beginning to carry various aspects to the next stage. It therefore recommends that it should be dissolved.

RECOMMENDATIONS

EXPERT COMMITTEE ON SOIL SURVEY: 7TH MEETING

OTTAWA, ONTARIO

20-21ST OCTOBER 1986

Recommendations
K.W.G. Valentine

A number of recommendations were put forward at the end of the meeting. They fell into two categories; 1) those pertaining to internal ECSS Working Group Activities, and 2) those to be submitted to the Canada Committee on Land Resource Services

1. ECSS Working Group Activities

- It is recommended that the soil survey units be provided with the resources required to assess and record on generalized soil landscape maps the extent and severity of past soil erosion, using existing data, information provided by knowledgeable individuals in each region of each province, air photos, field observations and professional insight. The project should be coordinated to provide consistency of interpretations between regions.

- It is recommended that each soil surveyor be requested to record the severity of past erosion, observed during new and ongoing soil surveys, on the daily form, on the detailed form and as part of the map symbol. This will provide a data base for comparisons in future years. Consistency of classes used must be reviewed.

- It is recommended that resources be provided to LRRC to have climate station and existing erosion research data analyzed to identify, and compute the probability of, severe winter-spring water and wind erosion events, and estimate the importance of these relative to the average summer or annual erosion predicted by the USLE and wind erosion equation. Where soil erodibility and movement data are inadequate or lacking, resources should be made available to have additional research undertaken.

- It is recommended that resources be provided to LRRC and soil survey units to investigate reported soil compaction, and develop procedures or models to predict its occurrence, estimate its significance to soil productivity, and permit mapping to proceed.

- The Agronomic Working Group recommended that formal arrangements be made with Expert Committee on Agrometeorology to ensure reciprocal representation on both Committees.

- It was recommended that a standardized data base for site specific soil and climatic information be designed in such a way that information could be used at any desired scale.

2. Recommendations submitted to the Canada Committee on Land Resource Services.
There were two "Research and Development" (R and D) recommendations, but no "Non Research and Development" (Non R and D) recommendations.

1. That Agriculture Canada establish a national soil conservation program to provide degradation monitoring, applied research and conservation planning to ensure the maintenance and improvement of Canada's Land Resources for food production.

Background

There is a persistently growing concern over the general deterioration of our land resources. A key requirement to ensure conservation of land resources and the enhancement of their productivity is the capability to monitor the quality (or degradation) of land resources. An adequate monitoring capability is necessary to assess the current state of Canadian land resources as a basis for policy and program development, the impact of agricultural practices on land quality, the remedial soil conservation practices recommended and the need for research to improve soil quality.

It is also clear that the assessment intensity must be adequate to provide information on processes at specific representative sites, and measurements to provide data on the extent and distribution of degradation. A reliable assessment will require a well supported and equipped field program.

2. That Agriculture Canada expand its research programs in soil management in all regions of Canada. It is also recommended that the current work in soils and all expanded activities be developed under the soil-management objective of the Research Branch to ensure the appropriate focus and orientation to soil research.

Background:

Efforts are being made in all regions of Canada to improve the viability, efficiency and productivity of Agriculture. The effective utilization, improvement and preservation of the soil are to be realized. The importance of improving soil and water Agri-Food objectives has been fully and clearly documented in the Land Resource Research Strategy prepared for CARC. Little progress has been made in the implementation and the strategy, while the current level of work in all areas of soils is considered seriously inadequate.

Work on all aspects of soil management must be rapidly expanded. Information on tillage, maintenance of fertility, improved drainage techniques, more efficient water use, management of salinity, prevention of acidification, control of erosion, is urgently required as a basis for planning and managing agricultural development and production in all regions of the country. It is also considered essential that work on soil management be developed on an interdisciplinary basis to ensure that research in soils and related fields of economics, engineering and plant science is integrated to assure the establishment of viable farming systems that allow the effective utilization, preservation, and enhancement of soil and water resources.

ANNUAL REPORT TO CCLRS

EXPERT COMMITTEE ON SOIL SURVEY: 7TH MEETING

OTTAWA, ONTARIO

20-21ST OCTOBER 1986

REPORT OF EXPERT COMMITTEE ON SOIL SURVEY
submitted to

CANADA COMMITTEE ON LAND RESOURCE SERVICES
November 1986

NOTE: This report is an internal working document and does not necessarily reflect the view of the federal or provincial Departments of Agriculture, the Universities, or other federal departments of industry.

REPORT OF 7TH MEETING OF THE EXPERT COMMITTEE ON SOIL SURVEY
held at Agriculture Canada Central Experimental Farm, Ottawa,
20th to 21st October 1986

The meeting received reports from all ten provinces and from the representative of PFRA. All Working Groups also reported, although only one, the CanSIS/Computer WG, met for a technical session. Due to travel budget restrictions there had been no meeting of the Expert Committee in 1985, and no technical meetings of its Working Groups either. Therefore, Working Group reports concentrated on the status of their work and recommendations for the future.

In his introductory remarks the Chairman, Dr. J.S. Clark, described some recent administrative and management changes in Agriculture Canada, and how they may affect the work of the Land Resource Research Centre (formerly Institute) and the workings of the Canada Committee system. He described the reorganization that has entailed the creation of Commodity Strategy Groups in Agriculture Canada and the fact that soil and water has been included as one of the Commodities. In addition he mentioned that there are deliberations on the changing structure of the Canada Committee system which may make committees less technical and more advisory, more concerned with policy. This may be of special significance to the Expert Committee on Soil Survey which has always had a strong technical bent with its numerous Working Groups inherited from the days of the National Soil Survey Committee. Lastly, brief mention was made of the Land Resource Research Centre's (LRRC) response to requests (stemming from the Task Force on Program Review - Nielsen Task Force) that it contract out more of its survey, cartographic and laboratory work and concentrate on national standards, procedures and associated research. The LRRC may have to take more of a federal role in future.

The provincial reports were then presented throughout the first day and the Working Group reports were presented on the second day. The meeting ended after a discussion of Working Group priorities, the actions taken on R and D and Non R and D recommendations to CASCC 1986, and current recommendations to be forwarded this year.

SUMMARIES OF PROVINCIAL REPORTS

NEWFOUNDLAND

Activities -
- Fourteen surveys have been printed or were in preparation during the last year
- Seven further surveys are in progress
- A detailed survey was conducted to assess soils of St. John's Agricultural Development Area for forage production
- The 1:1 million soil map and data base was completed to phase 1 stage for the island portion of the Province
- Soil Names file was compiled
- Capability rating for some mineral and organic soils were established

Future Activities
- Seven detailed soil surveys to complete the DREE program
- 1:1 Million map and data base compilation in Southern Labrador
- Compilation of cartographic computer files for the CanSIS system using ARC/INFO software

Concerns
- Increased costs of map printing faced by LRRC
- Lack of research into soil interpretations relevant to Newfoundland
- lack of research into soil degradation in Newfoundland

Recommendations
- Research support in soil interpretations and degradation
- Development of soil survey computer software packages
- Further research into the climatic characterization of the Pedoclimatic Zones of Newfoundland
- Establishment of soil monitoring sites

PRINCE EDWARD ISLAND

Activities
- Cooperation in tile drainage projects under ERDA Agreements
- Monitoring of irrigation projects on potato farms
- Monitoring factors of soil erosion and stream sedimentation under ERDA Agreements
- Preparation of Land Use publication for Atlantic Provinces

Recommendations
- The compilation of soil data bases in computerized soil information systems such as CanSIS should be coordinated with the Provinces so all natural resource agencies can benefit

NOVA SCOTIA

Activities
- Contract soil surveys under the Agri-Food Development Agreement are on schedule in the third of a four year contract
- Very detailed farm surveys have been started (LEAPS Program)
- Three soil surveys were complete including Pictou Co.
- Soil temperature and moisture monitoring was continued

Recommendations
- Research is needed into methods of soil interpretations for the LEAPS surveys, soil physical properties and crop growth, and soil drainage and degradation

NEW BRUNWSICK

Activities
- Soil surveys now available for whole Province at scale of 1:1 Million and 1:250,000 or 1:50,000
- Soil surveys of Woodstock, Florenceville and individual farms
- ERDA agreement activities include assessment of dense subsoils, drainage system and eroded lands

Recommendations
- Research is required on effects of soil erosion, compaction and acidification, as well as agronomic interpretations
- A provincial soil information system should be developed

- Detail soil mapping in forest lands is needed.

QUEBEC

Activities
- Soil surveys continued or completed in Beauce, Frontenac, Chambly, Richelieu, Verchères and Rouville Counties, and in parts of the Abitibi Témiscamingue Region
- An Agriculture Canada Contract survey was started by the University of Laval in Rimouski
- Research was conducted into glacial till soils of the Appalachians, wet clay soils, organic soils and the accuracy of soil surveys.

ONTARIO

A new five year Ontario Institute of Pedology Agreement was signed in 1985. Part of this agreement entailed surveys in Niagara, Brant, Middlesex, Elgin and Kent Counties as well as possibly the Regional Municipality of Durham. The first three are underway now.

Other Activities
- Research continues in soil interpretations, erosion, and the monitoring of watertables
- Forest soil and site programs continued in southern and northern Ontario
- There was further work on a Soil Information System for Ontario
- Work continued on the Southwestern Ontario Soil and Water Quality Enhancement Program (SWEEP)

Concerns and Recommendations
- Agriculture Canada should increase their staff commitment to the survey program
- Financial support be given to the LRRC map printing program
- LRRC develop CanSIS with ARC/INFO software to complement provincial information
- Land Use modelling be done for southern Ontario using the Guelph Land Evaluation System.

MANITOBA

Activities
- Surveys continued at scales of 1:125,000, 1:50,000 and larger
- Small scale maps of sensitivity to acidification and water and wind erosion were produced for the whole Province
- A soil Information data base is being produced under an ERDA agreement

Concerns
- Higher map printing costs faced by LRRC will delay publication of Manitoba survey projects
- The CanSIS system based on ARC/INFO software now planned for LRRC should be compatible with provincial systems and avoid duplication
- Soil data should be consistent and available enough to apply to Land Evaluation procedures
- Further soil inventory positions should be staffed

Recommendations

- Soil inventory in Agro-Manitoba should continue to be given high priority
- Methods should be developed for updating old surveys and test the reliability of new ones
- More efficient means of recording and assessing soil information should be explored, especially relating to Land Evaluation

SASKATCHEWAN

Activities -

- 2.4 million ha were mapped in west-central Saskatchewan and in the Melfort area. Preliminary maps and reports were prepared for 25 Rural Municipalities
- Three interpretive maps and reports have been published for Wolseley, Indian Head and Chester R.M.s, as well as water and wind erosion and salinity maps at 1:1 Million for the whole Province.
- Research was conducted into landscape and erosion interrelationships, cultivation of Black soils, soil salinity and the origin of salts, tillage and genesis of Solonetzic soils, spatial variability of soil characteristics, mapping reliability and genesis of clay soils

Future Requirements

- Soil Inventory of agricultural lands continue to be given high priority
- Research be continued or started in soil salinity, degradation from wind and water, genesis of solonetzic and Luvisolic soils and Land evaluation
- LRRC convert CanSIS to ARC/INFO software as soon as possible
- LRRC make effort to reverse the slow down of map publication (including RM series) due to higher printing costs
- Program be set up to monitor soil degradation

ALBERTA

Activities -

- Two major soil surveys and two land irrigability surveys were continued, and 1:1 Million interpretive maps were produced for water and wind erosion, salinity, acid sensivity and aridity
- Applied research for survey was conducted in mapping methods, contract procedures, development of geographic information systems, including The Soil Inventory Database for Management and Planning (SIDMAP).
- Research was conducted in soil irrigability, deep ploughing, organic soil productivity, forest terrain classification, inventory and interpretations, and remote sensing
- An Agricultural Land Rating System was developed

Concerns
- More coordinated work is needed on interpretations of soil information, and monitoring soil degradation
- Systems are needed for terrain and Land Use mapping
- Coordination required between Federal and provincial work on Soil and Geographic Information Systems

Recommendations
- A nationally co-ordinated action is required for developing GIS technology for managing electronic land resource information.

BRITISH COLUMBIA

The report for British Columbia was presented by Dr. D.E. Moon in place of Mr. H.A. Luttmerding who was unable to attend.

Activities
- Mapping of East Vancouver Island and the Gulf Island was completed. Maps and reports are now being prepared. Revised Maps of North Okanagen are also being prepared. Thirteen further surveys are moving towards publication.
- Applied research projects include revision of Agricultural Capability ratings for the Peace River, Reliability studies, a land use classification, Wildlife habitat mapping, a water management project in Boundary Bay, soil conservation and degradation studies, acid rain monitoring, forest soils research, soil degradation mapping and forest site classification.

Recommendations
- Efforts must be made to ensure compatibility between the Provincial soil information system (BCSIS/CAPAMP) and the federal (CanSIS/ARC-INFO).
- The federal soils positions in B.C. should be filled and additional support given to print soil maps as required.

PRAIRIE FARM REHABILITATION ADMINISTRATION (PFRA)

PFRA has been involved in a variety of soil conservation activities to mitigate on-farm soil degradation problems. They have concentrated on dry-land salinity and wind erosion, with some additional work on loss of organic matter, solonetzic soils and aridity. This work covers 40 to 50 quarter sections in the Swift Current, Weyburn and Lethbridge areas. The Saskatchewan RM survey reports have been found very useful in the first two areas.

Research is required into the processes of salinization and the extent of salt affected soils in the Prairies. It is also necessary to add an assessment of vegetative or residue cover to the wind erosion risk maps produced by LRRC to determine overall susceptibility to wind erosion, and to develop methods (such as determining cropping practices) to assess the success of soil conservation efforts.

SUMMARIES OF WORKING GROUP REPORTS

Ten Working Groups submitted reports. As there had been no Expert Committee meeting in 1985, no Working Groups had met for two years. There was not enough money to bring all Working Group members to Ottawa this year either, so Chairmen were asked to present status reports and recommendations for future work and priorities. The reports are summarized below.

SOIL CLIMATE: G.F. MILLS

Soil temperature and watertable measurements have been recorded over the last few years in all Provinces (except PEI) and in both Territories. Manitoba has the most extensive network. However, lengths of records vary, as does frequency of recording. Most but not all records have been stored in the CanSIS Monitoring File. The Agrometeorology Section of LRRC reported research into predictions of soil temperature.

Further work is needed on the publication entitled "Methodology for Monitoring Soil Temperature". All the data should be analyzed to refine the soil climate classes in the Canadian Soil Classification, and to help with regional soil correlation. However, this sort of work has not received high priority with reduced budgets.

Recommendation - Existing soil temperature data should be analyzed to assess its relationships with crop productivity, for inclusion in the national soil water classification systems, and for incorporation into soil correlation. The leadership should be taken by the Agrometeorology section of LRRC.

SOIL CLASSIFICATION WORKING GROUP: C. TARNOCAI

The report entitled "Amendments to the Canadian Soil Classification System" was prepared and the changes in the soil classification agreed to during the last working group meeting have been included. The publication of this report has, however, been deferred since DSS has indicated that the Canadian Soil Classification book is out of print. It is proposed that these amendments be incorporated in the new edition of this book.

A number of soil classification problems were identified during the last working group meeting. These problems are as follows:

a. The adequacy of the current criteria for a podzolic B horizon.
b. Classification of swelling clay soils
c. Lower case suffixes for the L, F, and H horizons

The work relating to these problems has been completed and it is recommended that the Soil Classification Working Group meet within the next two years to deal with these recommendations.

SOIL DEGRADATION: D.R. COOTE

Since 1984 most work has been put into soil degradation interpretations. The results have been produced as a series of maps and a report; "A Preliminary Economic Assessment of Agricultural Land Degradation in Atlantic and Central Canada and southern British Columbia". The maps

depicted the risk of water and wind erosion, acidification, and compaction, and the occurrence of salinity. They have been made from predictive models applied to the digitally recorded soil and landscape characteristics from 1:1 Million and 1:500,000 soil landscape maps.

Other research in regions with which the Working Group has cooperated has included erosion measuring plots (B.C., Ontario, New Brunswick and Prince Edward Island), detailed salinity mapping (Alberta and Manitoba), heavy metal monitoring (New Brunswick), evaluation of conservation methods (Ontario and PEI) and the calibration of a portable rainfall simulator (Ontario).

AGRONOMIC INTERPRETATIONS: B. van den BROEK

There has been considerable activity in individual Provinces in agronomic interpretations. Reports and refinements of the CLI ratings have been produced in Alberta, Saskatchewan, Ontario, New Brunswick, and Newfoundland. Specialized interpretations have been produced for small fruits and specialty crops in southern Ontario. However, the Chairman found it impossible to give very much time to the coordination of such activites through the Working Group due to overriding Provincial commitments. He therefore offered his resignation.

FORESTRY INTERPRETATIONS: D.E. MOON

The task of the Working Group was to prepare "A Manual for Interpreting Soil Information for Forestry". The Manual is nearly ready for technical edit. All but one major section is complete. An outline of the manual is given below.

1. Introduction
2. The nature of interpretive models
3. The nature of land resource inventories
4. Documentation and presentation (not yet prepared)
5. Case studies of interpretive procedures

The manual should be ready for outside review for technical content next year. Some reviewers have been contacted but others will be required. Final publication will depend in part on the reviewer's reactions.

CanSIS/COMPUTER: G. PATTERSON

G. Patterson was appointed as Chairman to succeed K.B. MacDonald. This was the only Working Group that met during the 1985 Expert Committee meeting. The federal members of the group, plus LRRC regional correlators and Land Evaluation researchers were asked to prepare recommendations for the structure and content of additional cartographic files that will form the INFO portion of ARC/INFO system to which CanSIS is being converted by LRRC. (Secretary's note: the acronyms and initialism in the latter part of this sentence must surely qualify this as an acceptable government report!).

The group recommended the creation of four files; for a Polygon, a Map Unit, a Soil Individual (the successor to the existing CanSIS Soil Names file), and a Layer. Approximately fifteen attributes were recommended, on the assumption that the national CanSIS files were for recording the principal characteristics of soil, and assessing them for crop productivity.

Emphasis was given to attributes available from past maps rather than attributes that might be collected in the future. The recommendations will be reviewed. Then the creation of these files will be required of soil survey units in 1987-88 in order to convert maps in CanSIS to the ARC/INFO software.

SOIL WATER AND IRRIGATION: R. EILERS

Soil survey units have been slow in testing and adopting the methods originally proposed in 1981 for characterizing soil water regimes. 1986 should have been the year for formal revision and adoption of the methods. However, only in the the Maritimes has there been a concerted effort to apply them. Most soil survey units are still using the old soil drainage classes.

The following activities remain more or less outstanding at present:

- the application of proposed methods to Cryosolic soils
- the integration of the methods with soil climate and soil taxonomy
- the revision of the Soil Water Investigations Methods Manual
- the automation of measurements at benchmark sites

Recommendations

- In order to complete the Working Group's task it is recommended that LRRC incorporate the activities above into a formal project with a budget and PYs.
- To promote the use of the proposed criteria and methods for describing soil water more field workshops should be arranged.

An associated piece of work has been completed. The final edit of the report entitled "An irrigation suitability classification for the Canadian Prairies" has been completed. Publication is expected in 1987.

SOIL SURVEY HANDBOOK: G.M. COEN

Sections 100 to 400 are complete, and have been translated into french. A francophone pedologist is now polishing the translation. Both english and french versions will be printed very soon. Section 600 has been completed and distributed for review. It is recommended that, when revised, section 600 be printed to accompany Sections 100 to 400. Sections 500 and 700 must await the completion of the reports on Agronomic and Forestry Interpretations.

LABORATORY QUALITY CONTROL: C. WANG

Accuracy, precision, consistency and comparability are important for soil survey laboratory analyses. The LRRC has published three reports on laboratory methods and quality control procedures. Eight new reference samples have been obtained from six soil orders. Standard analyses have been made of these samples by LRRC and they are now available to other laboratories for comparison and calibration of methods.

MAPPING SYSTEMS: K. VALENTINE

The activities of the Working Group are either complete or have been taken over by others. A paper specifying survey intensity levels has been published, procedures for detailed surveys are being specified by contracts, and the CanSIS/Computer Working Group is dealing with minimum data sets. The Chairman recommended that the Working Group be terminated.

GENERAL DISCUSSION OF WORKING GROUP REPORTS

A number of Working Groups reported a lack of progress because members and Chairmen were rarely given time for such work in their project plans, and other tasks usually took priority. This has been especially true for Provincial members of Working Groups. On the other hand there are a number of tasks that urgently need to be completed or continued, among them work on agronomic interpretations, soil degradation and conservation, and the design and file structure of CanSIS when it converts to ARC/INFO software. Consequently it was suggested that LRRC should, in its applied research and development work, take over some of the technical tasks of Working Groups and incorporate them formally in its own work plans. Provinces would contribute to the work whenever feasible, and evaluate the results for their own use.

The following Working Groups were given major priorities.

1. CanSIS/Computer
2. Agronomic Interpretations
3. Soil Degradation and Conservation
4. Forestry Interpretations

The following Working Groups are also to continue; Soil Water, Soil Survey Handbook, Soil Climate and Soil Classification.

RECOMMENDATIONS
R & D

1. Most Critical: Soil Conservation and Monitoring Research

Recommendation

That Agriculture Canada, in cooperation with other agencies, increases its support of soil and water conservation research, in particular that it pursue the program for monitoring soil quality and degradation via a computerized digital data base and land evaluation system, that was recommended last year.

Background

Soil and water conservation continues to be of primary importance to Canada. The Science Council of Canada in its 1986 Statement made specific recommendations for increased budgets and more scientists to be allocated to this work. Nearly all Provinces in their reports to the Committee mentioned soil and water Conservation. Agriculture Canada supported a similar recommendation in the 1986 CASCC "Action Taken" report.

2. Computerized Soil Information System

Recommendation

Agriculture Canada, through the Land Resource Research Centre, should take the lead in coordinating the development of computerized soil information systems to ensure compatibility between the CanSIS system now being converted to ARC/INFO software and other federal and provincial systems.

Background

Land Resource Research Centre is just converting its CanSIS system to commercial ARC/INFO software, which will make CanSIS potentially compatible with many other systems. Provincial governments such as Alberta, Manitoba and New Brunswick are also considering acquiring systems such as ARC/INFO. The coordination of federal-provincial responsibilities and the compatibility of data are urgently required.

3. Agronomic Interpretaitons

Recommendation

That Agriculture Canada, specifically the Land Resource Research Centre, develop national standards for agronomic interpretations.

Background

Many provinces are including refinements of Canada Land Inventory Agriculture Capability ratings in land use legislation. Elsewhere standard tested interpretations are required for credible land use planning. An agency such as LRRC is required to develop, test, and coordinate such interpretive systems across the country.

NON R and D

4. Map Printing Costs

Recommendations

Land Resource Research Centre be given a bigger budget for map printing.

Background

In 1986 Energy, Mines and Resources increased their charges for map printing approximately three-fold. This has meant that many maps urgently needed by Provinces such as Saskatchewan, Ontario, British Columbia and Manitoba have not been printed this year. Maps continue to be the most useful and requested form of Inventory data publication and should be supported.

MEMBERSHIP

Since 1984 two members have been reappointed, and four have been replaced. The full membership list is appended.

Keith Valentine
Secretary, ECSS
November 24, 1986
Ottawa

November 1986

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 Parliament Buildings Victoria, B.C. V8V 1X5 (604) 387-1145	1988
Alberta	K. Pohjakas Land Classification Branch Agriculture Centre Jail Road Lethbridge, Alta. T1J 4C7 (403) 381-5121	1988
Sask.	H. Rostad Saskatchewan Soil Survey John Mitchell Bldg. University of Saskatchewan Saskatoon Sask. S7N 0W0 (306) 975-4017	1988
Man.	G.F. Mills Canada Manitoba Soil Survey Soil Science Building University of Manitoba Winnipeg, Man. R3T 2N2 (204) 474-8153	1986
Ont.	B. van den Broek Ontario Inst. of Pedology Guelph Agricultural Centre University of Guelph Box 1030 Guelph, Ontario N1H 6N1 (519) 823-5700	1988
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	1986

N.B.	H. Rees Canada-New Brunswick Soil Survey Agric. Canada Res. Station P.O. Box 280 Fredericton, New Brunswick E3B 4Z7 (506) 452-3260	1987
N.S.	D.A. Holmstrom Canada Soil Survey Res. Branch, Agr. Canada Nova Scotia Agricultural College Truro, Nova Scotia B2N 5E3 (902) 895-1571	1986
P.E.I.	A.T. Raad Plant and Industry Branch P.E.I. Dept. of Agriculture Box 1600 Charlottetown, P.E.I. C1A 7N3 (902) 893-5465	1987
Nfld.	J. van de Hulst 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

<u>Departmental representatives</u>

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INA	I. Sneddon Resource Inventory Manager Land Management Division Northern Water, Lands and Forests Indian and Northern Affairs Hull, PQ K1A 0H4
EMR	R. Fulton Terrain Sciences Division E.M.R. 601 Booth Street Ottawa, Ontario

P.F.R.A.	W. Harron P.F.R.A. Motherwell Building 1901 Victoria Ave. Regina, Saskatchewan S4P 0R5
C.F.S.	J.J. Lowe National Forest Inventory Program Petawawa National Forestry Inst. Chalk River Ont. K0J 1J0 (613) 975-4017

		Term ends
Chairman	J.S. Clark (Reappointed) Land Resource Research Centre Central Experimental Farm Ottawa, Canada K1A 0C6	1986
Secretary	K.W.G. Valentine Land Resource Research Centre Central Experimental Farm Ottawa, Canada K1A 0C6	1987

APPENDICES

APPENDIX 1:

LIST OF CanSIS/COMPUTER W.G. PARTICIPANTS

B.C.	Dave Moon
Alta.	Tony Brierly
Sask.	Glen Padbury
Man.	Walter Fraser
Ont.	Keith Jones
Que.	Jean-Marc Cossette
N.B.	Herb Rees
N.S.	Gary Patterson (Chairman)
P.E.I.	Con Veer
Nfld.	Ed Woodrow
Y.T.	Scott Smith
Modelling	Reinder De Jong
Correlation	Jack Shields

APPENDIX 2:

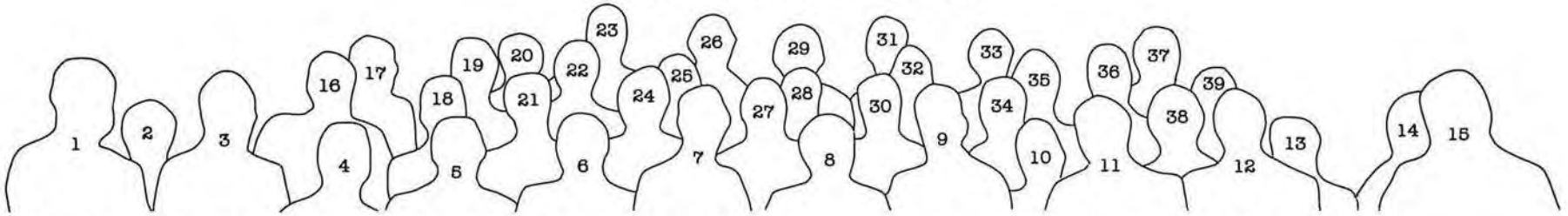
1986 ECSS Attendance List

YUKON		
Scott Smith	Canada Yukon Soil Survey	Whitehorse
BRITISH COLUMBIA		
David Moon	Canada Soil Survey	Vancouver
ALBERTA		
Tony Brierly	Alberta Canada Soil Survey	Edmonton
Gerry Coen	Alberta Canada Soil Survey	Edmonton
Bob Fessendon	Alberta Research Council	Edmonton
Kaljo Pohjakas	Land Classification Branch	Lethbridge
SASKATCHEWAN		
Don Acton	Agr. Canada Soil Survey	Saskatoon
Bob Eilers	Agr. Canada Soil Survey	Saskatoon
Bill Harron	P.F.R.A.	Regina
Glen Padbury	Agr. Canada Soil Survey	Saskatoon
Harold Rostad	Sask. Inst. of Pedology	Saskatoon
MANITOBA		
Wally Fraser	Canada Manitoba Soil Survey	Winnipeg
Gordon Mills	Canada Manitoba Soil Survey	Winnipeg
Bob Smith	Canada Manitoba Soil Survey	Winnipeg
ONTARIO		
Cliff Acton	Ontario Inst. of Pedology	Guelph
John S. Clark	Land Resource Research Centre	Ottawa
Dick Coote		
Reinder De Jong		
Julian Dumanski		
Brian Edwards		
Cathy Fox		
Brian Haddon	Petawawa Nat'l. Forestry Inst.	Chalk River
Keith Jones	Ontario Inst. of Pedology	Guelph
Echo Kodama	Land Resource Research Centre	Ottawa
Bruce MacDonald		
Sukhu Mathur		
John Ross		
Jack Shields		

1986 ECSS Attendance List (Continued)

Charles Tarnocai	Land Resource Research Centre	Ottawa
Clarke Topp		
Keith Valentine		
Bob van den Broek	Ontario Inst. of Pedology	Guelph
Chang Wang	Land Resource Research Centre	Ottawa
QUÉBEC		
Dominique Carrier	Serivce de la recherche en sol du MAPA	Ste. Foy
Jean-Marc Cossette	Inst. de Recherche Pédologique	Ste. Foy
Ian Sneddon	INA, Land Management Division	Hull
Jean Thie	DOE, Lands Directorate	Hull
NEW BRUNSWICK		
Herb Rees	Canada Soil Survey	Fredericton
NOVA SCOTIA		
Delmar Holmstrom	Canada Soil Survey	Truro
Gary Patterson	Canada Soil Survey	Truro
Ken Webb	Canada Soil Survey	Truro
PRINCE EDWARD ISLAND		
Awni Raad	P.E.I. Dept. of Agr.	Charlottetown
Conrad Veer	Canada Soil Survey	Charlottetown
NEWFOUNDLAND		
Gary Kirby	Rural Agr. and Northern Dev't.	Mount Pearl
Jan van de Hulst	Rural Agr. and Northern Dev't.	Mount Pearl
Ed Woodrow	Canada Soil Survey	St. John's West

Meeting of the Expert Committee
on Soil Surveys, Ottawa, 1986.



1. Delmar Holmstrom, 2. Brian Edwards, 3. Harold Rostad, 4. Dominique Carrier, 5. Kaljo Pohjakas, 6. Awni Raad, 7. Keith Valentine, 8. John S. Clark, 9. Herb Rees, 10. Charles Tarnocai, 11. Gordon Mills, 12. Jan van de Hulst, 13. Scott Smith, 14. Gary Patterson, 15. Bob van den Broek, 16. Ian Sneddon, 17. Jean Thie, 18. Don Acton, 19. Brian Haddon, 20. Bob Smith, 21. Gary Kirby, 22. Reinder DeJong, 23. Jack Shields, 24. David Moon, 25. Gerry Coen, 26. Conrad Veer, 27. Glen Padbury, 28. Jean-Marc Cossette, 29. Ed Woodrow, 30. Keith Jones, 31. Chang Wang, 32. Ken Webb, 33. Bob Fessendon, 34. Cliff Acton, 35. Bill Harron, 36. Bruce MacDonald, 37. Wally Fraser, 38. Bob Eilers, 39. Tony Brierley.

APPENDIX 3:

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