Pacific Regional Soil Science Society

NEWSLETTER

NUMBER 7 - May 1985

EDITORIAL

With this issue of the Newsletter we have been able to move our production to one of the UBC Forest Soils microcomputer systems, which enables us to enter the text directly. We would like to thank Laurens van Vliet for his contribution to this issue. This issue also contains reports on the Annual General Meeting and the Ninth B.C. Soil Science Workshop. We encourage all contributions to the Newsletter, including viewpoints/opinions, problems, current projects, reports/articles, titles of books, articles or project reports of interest to our readers, and member news, etc.

There are still some members who have not yet paid their dues for 1985. At $5.00 per year ($3.00 for students) we feel this Society has a lot to offer, so let's get that money in, eh? Our paid membership currently stands at 92 (37 members have not yet renewed).

PLEASE SEND NEWSLETTER IDEAS/CONTRIBUTIONS TO: Mike Curran or Paul Sanborn, Pacific Regional Society of Soil Science (address below)

ASSESSMENT OF SOIL DEGRADATION RISK FOR B.C. AND EASTERN CANANDA

L.J.P. van VLIET

(Land Resource Research Institute, Agriculture Canada, Vancouver)

Background

In response to a request by Regional Development Branch, Agriculture Canada, the Land Resource Research Institute in Ottawa has undertaken the task of providing the physical data base to estimate the extent and severity of soil degradation in Eastern Canada and British Columbia. Regional Development Branch will use this data base (1) to estimate the economic impact of soil degradation and limitations on agriculture and society, and (2) to estimate the cost of controlling soil degradation and of making soil improvements. This project started in January 1985 and will be completed by June 30, 1985.

You may wonder why this unique link between B.C. and Eastern Canada? For the simple reason that a similar study was completed in September

1984 for "Western Canada", which only includes the B.C. Peace River Region.

I will now discuss the B.C. project, which ties in with Eastern Canada regarding approach, interpretations, and deadlines.

Soil Landscape Maps for B.C.

The approach is taken to first produce soil-landscape maps for the ALR (agriculture land reserve) areas in B.C. at a scale of 1:500,000, using existing soil maps. Total area is approximately 4.7 million ha. We use methodology developed by Jack Shields, LRRI, Ottawa, for generalized soil-landscape maps. Five major attributes form the definitive criteria for creating polygons. They are: genetic parent material and its texture, surface form, slope, and soil development. For each polygon, a CanSIS extended legend form (i.e. polygon form) is filled in for recording the basic soil and slope information for both the dominant and subdominant soil in the polygon. The soil-landscape on manuscript maps and polygon forms will be completed. We expect to end up with approximately 400 polygons for B.C.

Degradation Risk Maps

Secondly, the polygons identified and mapped on the soil-landscape maps will be interpreted for the following degradation risks and improvement potential:

- Water erosion
- Wind erosion
- Soil acidification risk
- Risk of soil structure deterioration and compaction
- Potential drainage improvements and limitations
- Subsurface compaction layers (hardpans)

The methodologies for making these interpretations have been prepared by Dick Coote, LRRI, Ottawa. All necessary parameters for making these interpretations are presently recorded in a soil degradation subfile. Classes of each degradation type will be mapped. Degradation risk manuscript maps, the degradation parameter subfile, and degradation extent and severity summary tables will be completed in May.

This degradation risk assessment project not only provides a common approach and therefore a comparable data base between different regions (provinces) in Canada, but it also gives pedologists an opportunity to work directly with economists.

ANNUAL GENERAL MEETING

The Annual General Meeting was held in the MacMillan Building at U.B.C. in the evening following the first day of the Ninth B.C. Soil Science Workshop (discussed below). The day of good discussion was topped off with our evening meeting with an important social content, the wine and cheese party. Our thanks and appreciation are directed to Herb Luttmerding, Lawrence Lowe, Tim Ballard, Gary Runka, Bill van Lierop, and Hans Schreier for the Workshop activities, and to Art Bomke and the students for the wine and cheese party. The meeting was called to order at 7:35 pm and followed smoothly, with the President's report and approval of the Treasurer's report. The Nominating Committee recommendations for the executive were approved, and with no new nominations from the floor, the officers listed below have been duly elected:

Past President	Tim Ballard
President	Lawrence Lowe
Vice President	Terry Lord
Secretary	Bill Herman
Treasurer	Carol Jones

The accomplishments of the new Honorary Members were reviewed by the President. Honorary membership was accepted with thanks by Bruce Cann and Dick Spilsbury; (Laurie Farstad was presented with his plaque on May 1).

Tim Ballard asked for suggestions for topics for discussion and presentation at future meetings, raising the idea of technical workshops for practising soil scientists, and the example of Dave Moon's contibution to the use of computer technology in field work. Al van Ryswyk suggested the taping of keynote speakers' presentations for distribution to those interested (e.g. people who could not make the time or travel commitment); this was well accepted. Alan Goldin noted that a soils tour of the city of Bellingham is available.

Student Chapter activities and plans were reported; these included two guest speaker appearances last year (thanks to Keith Valentine and Terry Lewis), similar plans for this year, and plans for field excursions in the fall to research sites, etc. It was noted that all are welcome to the Student Chapter events and that, similar to the newsletter, if you have any ideas or suggestions to please come forward (- if you don't take the initiative, who will?). It was proposed that summaries of the Student Chapter guest discussions will occur in the newsletter, and that organization of similar interest groups (or Chapters) of the Society, on a regional basis, appears a

viable option for those living outside the lower mainland. Les Lavkulich moved that the executive look into means of providing the Student Chapter with some funds; this was seconded by Keith Valentine.

The report on the Newsletter emphasized the importance of contributions and feedback in making the Newsletter a continued success. The members were asked for suggestions for future editions of the newsletter. It was suggested that informing fellow readers of current research projects and fielding of ideas and opinions are important functions of the Newsletter. (Items welcome for inclusion in the Newsletter are wide-ranging, including current research projects, opinions/views, problems for discussion, new books/articles, project reports, upcoming meetings, member news and address changes, etc. etc. [limited by the contributors].)

With all business done, the new President adjourned the meeting in favor of the wine and cheese party.

Student Chapter

The Student Chapter has met twice since the AGM. Due to the heavy seminar schedule already existing in March, propsed speaker events were postponed and the first meeting was held to organize the interested members. It was encouraging to realize the number of students who are interested in becoming actively involved in the Student Chapter. Suggestions and plans for activities this year include field trips to visit areas of interest, including fellow students' research sites and a private tree farm; organizing small workshops with local people involved in agriculture and forestry, to let them know about current research and to share our expertise; a field tour of the local geology, and more seminars and discussion groups. A field trip to Bamfield Marine Station and research sites enroute has been proposed for the fall, along with a more active schedule of events on campus. Localized workshops in the Lower Mainland are currently in formative stages. Any and all suggestions from any members regarding Student Chapter activities are welcomed and encouraged, anyone is welcome to participate.

The second meeting was at Agriculture Canada (6660 NW Marine Dr.), and we would like to thank Dave Moon for an exciting look into current and future technology available for field survey and land evaluation, which is summarized below.

Ninth B.C. Soil Science Workshop

The workshop was held at UBC on February 21 and 22, 1985 and the session topics were: 1. The Needs and Expectations of Soil Analysis Users, 2. Approaches in Soil Analyses and Interpretations, and 3. How to Deal With Soil Variability. Over 150 people attended the Workshop and Proceedings will be produced in cooperation with the B.C. Ministry of Agriculture.

The Information Revolution: Impact on Soil Survey and Land Evaluation

(editors' summary of Dave Moon's talk to the Student Chapter)

There are many commercial Geographic Information Systems (GIS) available now; a number of these can run on microcomputers, possibly including new portable computers that fit in briefcases. An important feature of the new software is that they exhibit "topology"; that is, every point, line, and polygon is related to every other point, line or polygon in space - this is a feature that the more established, centralized systems such as BCSIS and CanSIS do not possess. Since the purpose of soil survey and land evaluation is to make interpretations in a geographic context, the importance of topology is evident.

We now have the technology to be able to complete a survey efficiently and state accurate reliability estimates. Since most economic decisions affecting land use are based on risk-type calculations, being able to state the properties of an area (e.g. slated for a subdivision) with known confidence limits and probability of extent is a definite bonus. Desired confidence levels can be achieved by sampling until one knows that the properties of interest are defined adequately (e.g. defineable tolerable error identified by the user during project formulation). This is facilitated by direct data entry in the field using a hand held microcomputer such as the Radio Shack 100. At Agriculture Canada a program has been written that will enable the user to design his/her own field data coding format. At the end of the day, the collected data are uploaded into a larger computer or mass storage. Statistical analysis of the data on a daily basis is relatively simple and enables calculation of required sample size for the various properties of interest.

Currently, most soil surveys are either under-sampling or over-sampling physical properties, often by an order of magnitude, and under-sampling for chemical analysis, although chemistry is often neglected in the final land-use analysis. In addition, there is often a certain amount of unnecessary ground truthing, perhaps in some cases in response to survey and interpretation guidelines (e.g. "number of inspections per map unit"). Clearly, for some ultimate uses of soil surveys, thee information interpreted from air photos is more than enough.

Most soil surveyors only use a limited part of the information available to them, including that which may be collected in the field. For example, Dave often uses mainly the airphoto features: elevation, texture, vegetation species, relative slope, slope position, tone, and surface patterns (e.g. landforms) when mapping the soil units that will ultimately serve to transfer soil information to the user. However, a tremendous amount of additional information is currently available, with considerably more advanced innovations on the horizon. Current information that is readily available includes: remote sensing data, data bases (e.g. existing resource inventories, topographic maps, climate and hydrological data, etc.), and air photos. Information that may be obtained or is becoming available includes ground penetrating radar, and laser profilometry. Clearly, modern soil survey is not even utilizing the readily available information, yet alone what is now becoming available! With available information, using a "layer cake" approach such as that proposed by the late Nurettin Keser about 10 years ago, a powerful pre-stratification of map units is possible, using all the criteria that we are currently using for our final mapping. Clearly, a software package with topology can prove very powerful at this stage, doing automated overlays of many maps with all the information from all the original maps still retained in a geographic context.

In a practical context, it is now possible to go into the field with your pre-stratification and do field work, uploading data to the microcomputer supporting the mapping software, and produce a map the day you return to the office (or another facility with a plotter). Also, there are "pocket geolocaters" becoming available that, using geographic-type satellites, can locate you on the ground within meters horizontally; hence, it is possible to know the true location of a unit boundary or a sample point. There are also now available stereo orthophotos, which help overcome the age-old problem of transferring air photo interpretations to horizontally controlled mapping - a major source of error in soil mapping.

Also, the old adage that there is minimal correlation between vegetation and soil comes from the attempt to correlate with defined soil class or without adequate prior stratification. In fact there can be very high correlations between vegetation and certain soil properties, such as organic matter content, texture, and parent materials. Local knowledge of these relationships allows soil surveyors to use remotely-sensed vegetation data.

The new systems also allow the manipulation of data with regard to neighboring map units (e.g. contiguous attributes). This means that it is no longer necessary to search an interpretive map for, for example, map units of high slope failure potential, to decide how to rate the units downhill - the program can do it. Similarly, it is possible to predict sediment load in a stream by considering the sediment yield and buffering properties of the map units in the catchment (along with surface cover, etc.). Economic viability of farms or transportation corridors may be evaluated based on soil unit properties and transportation corridor information that may be coded with the other geographic information. It is also possible to search for contiguous land areas, e.g. areas suitable for growing corn that are 30 ha or larger.

How do these new systems relate to BCSIS and CanSIS, what is the cost of these kind of systems, what is the time required to learn a system and make it operational, is communication possible between these systems and also with data banks with geographic information systems,

(continued, p. 6)

what is the danger of this technology, etc?????. BCSIS and CanSIS represent centrally based systems that are generally designed to produce lots of maps of large areas; whereas, the technology discussed here is designed for all users supported by micro- or larger computers. (Two of the better packages available only need 64K memory, and although micros are considered slow for maps of 1000 delineations or more, most maps are in the range of about 500 to 800 delineations.) These systems cost about $100,000 including hardware, and can be cheaper if bulk purchases are arranged. Terry Lewis noted that this cost is not too great for a small consulting company with about three partners. Apparently one of the systems can be operational within about 5 weeks with training provided by the supplier. Communication is possible between various systems; however, some of the government information systems are not currently compatible (e.g. CLI data with the CANSIS system). There are two kinds of dangers in introducing this kind of technology: 1) there is potential for abuse by mappers/interpreters because it is very easy to come up with an impressive presentation regardless of reliability, and 2) it may be misunderstood by various land managers who use the product.

In summary, geographic information systems are the way of the future and are changing the way we plan and carry out survey and interpretations. However, it will take some time before those who plan and budget surveys may accept the idea of varying sampling intensity within a project area based on guidelines generated by in-the-field data analysis. (Agriculture Canada regional offices are currently being equipped to enable them to service their local needs.) There is now, more than ever, need to carry out more basic research to increase our understanding of soil so that we can now take advantage of what is available. There is a lag in soil survey and land evaluation, between when technology becomes available and when it is actually used; we still do not use all the ideas presented by people such as Nurettin Keser over 10 years ago. There needs to be caution in presenting the current capabilities of available technology; one of the misfortunes of CanSIS was that too much was claimed too early, creating unrealistic expectations.

BOOKS/ARTICLES

Berg, M.E. (ed.). 1983. Soil and overburden requirements for successful revegetation. Proc. Conf. held Feb. 22, 1983, Denver, Colorado. U.S. Office of Surface Mining, Western Tech. Center, Denver, CO. 190pp.

Eisbacher, G.H. and J.J. Clague. 1984. Destructive mass movements in high mountains: Hazard and management. Geol. Survey of Canada. Paper 84-16. 230pp.

Hausenbuiller, R.L. 1985. Soil science, principles and practices, Third Ed. Wm. C. Brown Publishers. Dubuque, Iowa. 610pp.
(a good introductory soil science text that includes the Canadian System of Soil Classification)

Milo I. Harpstead and Francis D. Hole. 1980. Soil science simplified. Iowa State University Press, Ames, Iowa. 121pp.
(a good book for people interested in the less technical aspects of soil science, useful for natural scientists and the lay person alike, used as text for some extension-type courses)

Journal of Soil and Water Conservation, Vol. 40, No. 1 (Jan.-Feb. 1985). Nonpoint Water Pollution: A Special Issue. 176pp.

Senator Sparrow Addresses Annual Meeting of B.C. Chapter, Soil Cons. Soc. Am.

The first annual business meeting of the B.C. Chapter of the SCSA was held on February 20, 1985 and was attended by about 30 people. The highlight of the evening was the talk by the Honourable Herbert O. Sparrow on the topic "Soil at Risk" Canada's Eroding Future", which was co-sponsored by the UBC Faculty of Agricultural Sciences. Senator Sparrow's talk summarized a study by the Standing Senate Committee on Agriculture, Fisheries, and Forestry that revealed that soil erosion is costing Canadian farmers over one billion dollars a year in lost income. The Senate's report has apparently been successful in bringing the issue of soil degradation to the attention of both the public and politicians. (from SCSA B.C. Chapter Newsletter)

MEMBER NEWS, Etc.

Following are brief biographies of the new Honorary Members:

Dick Spilsbury obtained his B.Sc. and Master's degrees at UBC. In 1931, before his Master's, he joined C.C. Kelley as the federal representative in the joint federal-provincial soil survey effort. He was involved in the soil surveys of the lower Fraser Valley and the Okanagan and Similkameen Valleys. In 1938, he resigned as federal soil surveyor to accept a position with the B.C. Forest Service. For many years, until his retirement, he was Director of Research for the B.C. Forest Service. Author or co-author of several publications, including soil survey reports, and a couple of classic papers: Spilsbury and Tisdale, "Soil-plant relationships and vertical zonation in the southern interior of British Columbia" and Spilsbury and Smith, "Forest site types of the Pacific Northwest".

Bruce Cann attended Macdonald college for his first two degrees and obtained his Ph.D. from Michigan State. He started working on the soil survey in Quebec in 1939. After service in the armed forces, he returned to soils work. He attended the first meeting of the National Soil Survey Committee of Canada. For nearly 20 years, he led the soil survey program in Nova Scotia. He topped off his active career with work as a correlator n Ottawa and later in Fredericton. Bruce retired in the mid-1970's and now lives in the Lower Mainland.

Laurie Farstad was born in Saskatchewan, took his Bachelor's degree there, and several years later obtained his Master's degree at UBC. In 1936, he began working as a soil surveyor with the federal Department of Agriculture under PFRA in Saskatchewan. Later, he came to B.C. and headed the soil section of Agriculture Canada in Vancouver. We all know him from numerous soil survey reports and other publications that came out of his work here. Laurie took several overseas assignments in such places as Argentina, Equador, Nigeria and Brazil. After retirement from Agriculture Canada, Laurie remained active as a soils consultant for several years.

MEETINGS:

June 17-19, 1985. International Conference on Soil Dynamics. Auburn, Alabama. Contact: W.R. Gill, Conference Coordinator, National Tillage Machinery Lab, P.O. Box 792, Auburn, AL 36831-0792.

June 17-20, 1985. Western Soc. Soil Science, Western Soc. Crop Sci., Branch Meetings, Reno, Nevada.

June 18-20, 1985. Douglas-fir: Stand Management for the Future. Univ. Washington, Seattle. Contact: Dr. C. Oliver, College of Forest Resources AR-10, Univ. Wash., Seattle, WA 98195

June 23-24, 1985. Third International Symposium on "Iron Nutrition and Interactions in Plants," Lincoln, NE.

June 23-26, 1985. Summer Meeting of Am. Soc. Agricultural Engineers, East Lansing, MI.

Canadian Society of Soil Science Annual Meetings:

June 23-26, 1985. Charlottetown, P.E.I.

July 6-10, 1986. Saskatoon, Sask.

1985 Theme: New crops and their fertility requirements and soil erosion in relation to food production potential. At University of Prince Edward Island, Charlottetown. Contact: Dr. J.A. McLeod, Agric. Canada Res. Sta. P.O. Box 1210, Charlottetown, P.E.I. C1A 7M8 (ph [902]892-5461)

July 8-10,1985. Potassium in Agric. Symposium, (cosponsored in part by ASA, CSSA, SSSA), Atlanta, Georgia. Contact: Dr. Armstrong, Pot. and Phosph. Inst. 2901, Buford Hwy, N.E., Ste. 401. Atlanta, Georgia 30329 USA

August 4-7, 1985. 40th Annual Meeting, Soil Conservation Society of America. "Conservation: A Matter of Motivation". Marroutt's Pavillion Hotel, St. Louis, Missouti. Contact: SCSA, 7515 N.E. Ankeny Rd., Ankeny, Iowa 50021-9764.

August 16-17, 1985. The First Atlantic Symposium on Remote Sensing and Geographic Information Systems. Lawrencetown, Nova Scotia. Contant: E. Wedler, Gen. Chairman, N.S. Land Survey Inst., P.O. Box 10, Lawrencetown, N.S., B0S 1M0, (tel. [902] 584-2226)

August 20-22, 1985. PECORA X, The Seventh W.T. Pecora Memorial Remote Sensing Symposium in Forestry and Range Resource Management. Colorado State University, Fort Collins. Program Chairperson: Dr. P. Haas, USGS - EROS CENTER, Sioux Falls SD 57198 (ph [605]594-6114). Sponsored by USGS, ASP, NASA, Soc. for Range Management, and Am. Soc. Foresters.

August 21-23, 1985. 7th York Quaternary Symposium. Theme: The Paleoenvironmental Reconstruction of the Late Wisconsin Deglaciation and the Holocene. FIELD TRIP Aug. 24-26., Univ. Lethbridge. Contact: Dr. R.W. Barendregt, Geog. Dept., Univ. Lethbridge, 4401 University Dr. Lethbridge, Alta T1K 3M4.

Nov. 17-21, 1985. Third International Drip/Trickle Irrigation Congress, (sponsored in part by ASA, CSSA, SSSA), Fresno, California.

Dec. 1-6, 1985. Soil Sci. Soc. America, Am. Soc. Agron.,Crop Sci. Soc. Am. Annual Meetings, Chicago, Illinois.