

CHALLENGES IN COOPERATIVE

RECLAMATION RESEARCH

by

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Thirty to forty years ago the development of efficient earthmoving equipment made it feasible to extract coal and other minerals by surface mining methods. Initially the acreage affected was small. The mine operators who recognized their responsibility to reclaim the disturbed land were the pioneers in mined land reclamation. Reestablishment of vegetation was the immediate objective and reclamation technology was borrowed from agricultural and forest sciences. As the surface mining industry expanded and the acreage disturbed increased, the need for more intensive research became necessary. Applied research focused on vegetation establishment. Initially the interest was in species adaptation and the influence of spoil characteristics and site variables on plant survival and growth.

From this modest beginning the scope of reclamation research has expanded to include such diverse subjects as: factors to consider in planning a mining operation; practical earth movement and placement methods that complement the reclamation plan; restoration programs to meet specific land use objectives. Although applied research still dominates, more sophisticated reclamation technology has stimulated more interest in basic research. Today's research priorities recognize the need to minimize the negative impact of surface mining on our environment without jeopardizing the financial integrity of the mining industry.

Policies relating to the administration of reclamation research programs demonstrate a recognition of the complexity of the problems, and the interaction between many facets of reclamation technology. To meet the challenge, multi-disciplinary research groups were formed to attack in depth, specific problem areas. These units are effective but the scope of their research is limited by financial and physical constraints. A logical alternative appears to be an expansion of cooperative reclamation research. This is not a new concept but we have not developed it to its full potential.

There may be different interpretations of cooperative reclamation research, so it is appropriate to explain how the term will be used in subsequent discussions. The basic concept is to broaden the scope of existing research programs by encouraging the formation of cooperative units that are composed of two or more research groups. Selective development of a cooperative unit will permit the most efficient use of the expertise and facilities available to research a priority problem. Until the concept has proven its value, funding may be a problem because it breaks with tradition. Initially, it may be advisable to fund each research project in the cooperative unit individually. Ultimately it would be advantageous to fund the cooperative unit and delegate the administration of the project to a member that has management capabilities.

The opportunities for cooperative reclamation research exist in every research group. Perhaps the greatest potential occurs in our colleges and universities. This is particularly true for institutions located in localities where surface mining contributes substantially to the regional economy. The challenge to the academic community is to recognize its opportunities and to strive for a leadership role in cooperative reclamation research.

Cooperative projects may involve administrative units within the institution, government research groups, or other colleges and universities. High priority should be placed on cooperative research with outside groups. These contacts can be mutually beneficial by introducing new perspectives and by sharing research capabilities. It will not be an easy task because it will mean dismantling established traditions and revising the missions of established research groups.

The success of expanded cooperative reclamation research in colleges and universities depends upon recognition and support by top administrative officials. Historically, many of the current research projects in our academic institutions resulted from the interest and dedication of one or two scientists. The administration approves projects but staff members often fail to receive adequate tangible administrative support. Without this administrative assistance, the scope of these projects is limited and the opportunities for expansion are restricted.

Administrative support of reclamation research should include the establishment of procedures and facilities for administering, coordinating, and financing cooperative projects. Consideration should be given to modification of teaching schedules to accommodate research priorities. Establishment of research review procedures is essential to maintain a high standard of quality and acceptable levels of accomplishment. Administrative support services could relieve the individual scientist of many of the routine duties usually associated with cooperative research.

The challenge to government research organizations is to overcome administrative and political constraints that discourage cooperative projects. These may be real or imagined. Administrative restraints involve problems associated with the development of appropriate cooperative agreements, legal commitments of appropriated funds and personnel management. The existence of complex cooperative agreements indicates these constraints can be overcome with diligence and ingenuity. Politically, the concern may be that cooperative research will dilute the prestige of the government agency thus reducing its political strength when attempting to justify continuing or expanded appropriations. There may be validity to this concern, but documentation of the results of high quality, productive, cooperative research projects can be equally impressive to legislative bodies.

Potential cooperators must also recognize that government agencies have much more to offer than financial assistance. One of the most attractive incentives is a capability to conduct field studies of limited or regional scope. Cooperation with government agencies also provides continuity for long term research projects. Existing facilities and equipment can be made available to cooperators. The acquisition of specialized equipment may be expedited by government purchasing procedures.

Mining companies seldom have the capability or desire to conduct reclamation research, but they can and do serve important functions in the research process. The challenge in this case is to fully utilize the available research support. The mining industry should be invited to participate in research programs. They can cooperate by identifying and defining specific reclamation problems, recommending appropriate variables for measurement and analysis, providing suggestions regarding establishment procedures and assisting in the interpretation of research results. Cooperating companies can be utilized to test the practicality of research results and make suggestions regarding modifications that will improve efficiency or reduce costs. The adoption of reclamation procedures developed through cooperative research programs is an important testimonial to their practicality and value.

Negotiating cooperative programs with industry requires an understanding of corporate philosophies and structure. As corporate entities they are production oriented and cost conscious. Many are suspicious of programs that may increase costs or intensify regulations that govern their operation. Corporate executives and top management personnel often do not understand or appreciate the research process. However, if they are advised of the plans, progress, and results of cooperative research many companies will provide important support services.

A stigma regarding the credibility of research conducted in cooperation with industry does exist. Maintenance of a high standard of research competence and candid reference to cooperative projects with industry will satisfy many unbiased critics.



While academic institutions, government agencies, and the mining industry offer the greatest potential for cooperative reclamation research, other groups should be encouraged to participate. Regulatory agencies and environmental groups should be involved in cooperative reclamation research. In addition to financial support, the regulatory agencies can assist with problem definition and selection, and interpretation of results. In return they will become more familiar with research procedures and have immediate access to new reclamation technology. The traditional role of environmental groups has been to expose conditions contributing to environmental degradation. They can serve equally well as consultants for research programs that are attempting to understand, alleviate, or correct problems attributable to the surface mining industry.

Private consulting firms have proliferated and prospered in recent years. Many have competent multi-disciplinary staffs that provide the capability for quality research. It is conceivable they could also serve as coordinators of cooperative reclamation research. Their staff and facilities could be used to administer cooperative programs involving any of the groups previously mentioned. It is also possible they could be assigned segments of cooperative projects initiated by other research groups.



This certainly does not identify all opportunities for cooperative reclamation research. The intent was to demonstrate the need for this research and to identify situations where it could function effectively. Challenges presented for consideration are as follows:

1. Expansion of cooperative research within our academic institutions with high priority given to outside cooperators.
2. Governmental research groups need to overcome administrative and political constraints that inhibit participation in cooperative research.
3. Recognition that government agencies have more to offer than financial assistance.
4. Utilization of the support the mining industry can provide.
5. Participation by regulatory agencies and environmental groups.
6. Utilization of private consulting firms as administrators of cooperative reclamation research projects.

**PROCEEDINGS**  
**OF**  
**THE SECOND ANNUAL GENERAL MEETING**  
**OF THE**  
**CANADIAN LAND RECLAMATION ASSOCIATION**

**August 17, 18, 19 & 20 — 1977      Edmonton, Alberta**

**( Sponsored by the Faculty of Extension, University of Alberta )**

P R O G R A M

Canadian Land Reclamation Association

Second Annual General Meeting

August 17, 18, 19, 20, 1977

Edmonton, Alberta

Wednesday, August 17 (Optional Field Trips)

Field Trip No. 1 (Athabasca Tar Sands)

Leader: Philip Lulman (Syncrude Canada Ltd.)

Fee: \$100.00 (covers bus and air transportation, lunch, and field trip information pamphlets)

Schedule: 7:30 am. - delegates board bus at Parking Lot T, located immediately south of the Lister Hall Student Residence complex. Air transportation from Edmonton Industrial Airport to Fort McMurray and return. Guided bus tour of surface mining and reclamation operations on Syncrude Canada Ltd. and Great Canadian Oil Sands Ltd. leases.  
6:30 p.m. - delegates arrive back at Parking Lot T, University of Alberta campus.

Field Trip No. 2 (Aspen Parkland; Forestburg Coal Mine Reclamation)

Leader: George Robbins (Luscar Ltd.)

Fee: \$25.00 (covers bus transportation, lunch, and field trip information pamphlets)

Schedule: 8:00 a.m. - delegates board bus at Parking Lot T, located immediately south of the Lister Hall student residence complex. Guided bus tour southeast of Edmonton, stopping at various points of interest (oil spill reclamation field plots; Black Nugget Park [abandoned minesite]; trench plots on Dodds-Roundhill Coal Field; solonchic soil deep ploughing site) on the way to the Luscar Ltd. Coal Mine at Forestburg.  
6:30 p.m. - delegates arrive back at Parking Lot T, University of Alberta campus.

Thursday, August 18

- Events: Opening of Formal Meeting; Presentation of Papers
- Location: Multi-Media Room, located on second floor of Education Building, University of Alberta.
- 8:00 a.m. Authors of papers being presented on August 18 meet with paper presentation chairmen and audio-visual co-ordinator (Douglas Patching)
- 9:00 a.m. Meeting Opened by Dr. Jack Winch (President of the C.L.R.A.; Head of the Department of Crop Science, University of Guelph). Comments by Dr. Winch.
- 9:15 a.m. Welcome to delegates on behalf of the Government of Alberta by the Hon. Mr. Dallas Schmidt, (Associate Minister Responsible for Lands, Alberta Department of Energy and Natural Resources)
- 9:25 a.m. Commencement of Paper Presentations. Morning session chaired by Mr. Henry Thiessen (Chairman of the Land Surface Conservation and Reclamation Council and Assistant Deputy Minister, Alberta Department of Environment).
- 9:30 a.m. Paper 1. Combined Overburden Revegetation and Wastewater Disposal in the Southern Alberta Foothills by H.F. Thimm, G.J. Clark and G. Baker (presented by Harald Thimm of Chemex Reclamation and Sump Disposal Services Ltd., Calgary, Alberta).
- 10:00 a.m. Paper 2. Brine Spillage in the Oil Industry; The Natural Recovery of an Area Affected by a Salt Water Spill near Swan Hills, Alberta by M.J. Rowell and J.M. Crepin (presented by Michael Rowell of Norwest Soils Research Ltd., Edmonton, Alberta)
- 10:30 a.m. Coffee Recess
- 11:00 a.m. Paper 3. The Interaction of Groundwater and Surface Materials in Mine Reclamation by Philip L. Hall of Groundwater Consultants Group Ltd., Edmonton, Alberta.
- 11:30 a.m. Paper 4. Subsurface Water Chemistry in Mined Land Reclamation; Key to Development of a Productive Post-Mining Landscape by S.R. Moran and J.A. Cherry (presented by Stephen Moran of the Research Council of Alberta, Edmonton, Alberta).
- 12:00 noon Lunch Recess

- 1:25 p.m. Continuation of Paper Presentations. Afternoon session chaired by Mr. Philip Lulman (member of C.L.R.A. executive; reclamation research ecologist with Syncrude Canada Ltd.).
- 1:30 p.m. Paper 5. Coal Mine Spoils and Their Revegetation Patterns in Central Alberta by A.E.A. Schumacher, R. Hermesh and A.L. Bedwany (presented by Alex Schumacher of Montreal Engineering Company Ltd., Calgary, Alberta).
- 2:00 p.m. Paper 6. Surface Reclamation Situations and Practices on Coal Exploration and Surface Mine Sites at Sparwood, B.C. by R.J. Berdusco and A.W. Milligan (presented by Roger Berdusco of Kaiser Resources Ltd., Sparwood, B.C.).
- 2:30 p.m. Paper 7. Agronomic Properties and Reclamation Possibilities for Surface Materials on Syncrude Lease #17 by H.M. Etter and G.L. Lesko (presented by Harold Etter of Thurber Consultants Ltd., Victoria, B.C.).
- 3:00 p.m. Paper 8. The Use of Peat, Fertilizers and Mine Overburden to Stabilize Steep Tailings Sand Slopes by Michael J. Rowell of Norwest Soils Research Ltd., Edmonton, Alberta.
- 3:30 p.m. Coffee Recess
- 4:00 p.m. Paper 9. Oil Sands Tailings; Integrated Planning to Provide Long-Term Stabilization by David W. Devenny of E.B.A. Engineering Consultants Ltd., Edmonton, Alberta.
- 4:30 p.m. Paper 10. Bioengineering. The Use of Plant Biomass to Stabilize and Reclaim Highly Disturbed Sites by H. Schiechtel and SK. (Nick) Horstmann (presented by Margit Kuttler).
- 5:00 p.m. End of August 18 Sessions.



Friday, August 19

- Events: Presentation of Papers; C.L.R.A. Annual General Business Meeting; C.L.R.A. Annual Dinner.
- Locations: Paper presentations and C.L.R.A. Annual General Business Meeting in Multi-Media Room, located on second floor of Education Building, University of Alberta.  
- Annual Dinner held in Banquet Room located on second floor of Lister Hall.
- 8:00 a.m. Authors of Papers being presented on August 19 meet with paper presentation chairmen and audio-visual co-ordinator (Douglas Patching).
- 8:30 a.m. Showing of Film Rye on the Rocks. This film depicts reclamation situations at Copper Cliff, Ontario and is being shown for the purpose of introducing delegates to the site of the 1978 C.L.R.A. meeting (Sudbury, Ontario).
- 8:55 a.m. Continuation of Paper Presentations. Morning session chaired by Dr. J.V. Thirgood (Vice-President of C.L.R.A.; member of Forestry Faculty, University of British Columbia).
- 9:00 a.m. Paper 11. Reclamation of Coal Refuse Material on an Abandoned Mine Site at Staunton, Illinois by M.L. Wilkey and S.D. Zellmer (presented by Michael Wilkey of the Argonne National Laboratory, Argonne, Illinois).
- 9:30 a.m. Paper 12. A Case Study of Materials and Techniques Used in the Rehabilitation of a Pit and a Quarry in Southern Ontario by Sherry E. Yundt of the Ontario Ministry of Natural Resources, Toronto, Ontario).
- 10:00 a.m. Coffee Recess.
- 10:30 a.m. Paper 13. Amelioration and Revegetation of Smelter-Contaminated Soils in the Coeur D'Alene Mining District of Northern Idaho by D.B. Carter, H. Loewenstein and F.H. Pitkin (presented by Daniel Carter of Technicolor Graphic Services Inc., Sioux Falls, South Dakota).
- 11:00 a.m. Paper 14. The Influence of Uranium Mine Tailings on Tree Growth at Elliot Lake, Ontario by David R. Murray of the Elliot Lake Laboratory, Elliot Lake, Ontario.

- 11:30 a.m. Paper 15. Weathering Coal Mine Waste. Assessing Potential Side Effects at Luscar, Alberta by D.W. Devenny and D.E. Ryder (presented by David Devenny of E.B.A. Engineering Consultants Ltd., Edmonton, Alberta).
- 12:00 noon Lunch Recess.
- 1:25 p.m. Continuation of Paper Presentations. Afternoon session chaired by Dr. John Railton, (Manager, Environmental Planning, Calgary Power Ltd., Calgary, Alberta).
- 1:30 p.m. Paper 16. The Distribution of Nutrients and Organic Matter in Native Mountain Grasslands and Reclaimed Coalmined Areas in Southeastern B.C. by Paul F. Ziemkiewicz of the Faculty of Forestry, University of B.C., Vancouver, British Columbia.
- 2:00 p.m. Paper 17. Systems Inventory of Surficial Disturbance, Peace River Coal Block, B.C. by D.M. (Murray) Galbraith of the British Columbia Ministry of Mines and Petroleum Resources, Victoria, British Columbia.
- 2:30 p.m. Paper 18. The Selection and Utilization of Native Grasses for Reclamation in the Rocky Mountains of Alberta by D. Walker, R.S. Sadasivaiah and J. Weijer (presented by David Walker of the Department of Genetics, University of Alberta, Edmonton, Alberta).
- 3:00 p.m. Coffee Recess; Distribution of Proceedings.
- 3:30 p.m. Commencement of 1977 General Business Meeting of the Canadian Land Reclamation Association. Meeting chaired by Dr. J.V. Winch, C.L.R.A. President.
- 7:30 p.m. Commencement of C.L.R.A. Annual Dinner in Banquet Room, second floor of Lister Hall.
- Guest Speaker: William T. Plass, Principal Plant Ecologist, U.S.D.A. Forest Service, Northeastern Forest Experiment Station, Princeton, West Virginia.
- Topic of Speech: Challenges in Co-operative Reclamation Research.
- Note: Following the Annual Dinner and Mr. Plass's speech, delegates may retire to the adjacent Gold Room. A bartender will be on service until midnight.