THE RECLAMATION PROGRAMME

AT THE

FACULTY OF FORESTRY

UNIVERSITY OF BRITISH COLUMBIA

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This paper presents a brief overview of reclamation activities in the Faculty of Forestry. It provides an example of what can be done by a small group with a continuing programme and limited financing.

Paul Ziemkiewicz has already reported on one study that provides an example of the kind of thing that can be done at the University with the co-operation of industry. I now want to discuss our programme in broader terms, also to give some indication of the viewpoint.

Our Reclamation Programme in Forestry started in 1968. It was the first such programme in Western Canada and, probably, in Western North America. Since that time we have produced almost 40 publications in the form of Ph.D., Master's and Bachelor theses, journal articles and conference papers and have provided a means of international communication and exchange of information through a widely distributed newsletter. In co-operation with the University Centre for Continuing Education three short courses have been held. Most important, we have provided educational opportunities - training - for a number of men who are now working professionally in the field.

Our Faculty interest in land reclamation was stimulated initially by a request from the then general manager of Kaiser Coal Ltd. for advice as to how the company might tackle its reclamation problems.

In subsequent years our interests have become considerably broader than
the surface mining situation in the East Kootenays but I would like to pay tribute to the continuing support that Kaiser Resources has given since that time. The Kaiser Resource Fellowship in Land Reclamation and a senior class prize in conservation, also provided by Kaiser, have provided the essential seed money for continuity of student support upon which we can build, without, I would stress, any limitations or restrictions whatsoever on the areas of study. No less important has been the continuing informal co-operation that is demonstrated by the paper you have just heard, the opportunities for summer employment that have provided valuable experience for our students, and, not least, the continuing contacts with Kaiser’s reclamation staff.

But it would be wrong to suggest that Kaiser Resources alone has provided facilities for student research. Other companies have provided support and facilities and I cannot recall one request that has been refused. Theses have resulted out of work on the copper deposits in the Highland Valley, vegetational recovery in the Columbia Valley at Trail, and at Kitsault where co-operation with Climax Molybdenum and its predecessor, B.C. Molybdenum, has permitted us over the past 8 years to make continuing observations under north coast conditions, ranging from a Ph.D. study of the recovery of vegetation at the Anyox smelter and along Observatory Inlet, to the establishment of long term species and site amelioration trials on the Kitsault mine dumps and, incidentally, to provide a valuable educational experience for several reclamation students. There are several people in this room who have accompanied me on our annual pilgrimage up Alice Arm.

I was but newly returned to the Province in 1969 and just into our programme when the public controversy on surface mining erupted and I found myself quite unwittingly in the eye of the hurricane for merely stating that mine waste was not the hopelessly sterile or even toxic
material that was the common view at that time, that reclamation of
mined land had been successfully undertaken in other parts of the world
and that I believed that Kaiser meant it when it said that it intended
to undertake a significant reclamation programme.

For a time I thought I was going to be carried out of the Province on a
rail, but 8 years later I feel vindicated. As the papers presented at
this meeting attest, there is a serious reclamation programme underway
in the Crows Nest Pass which shows encouraging successes. Throughout
the Province we can see that it has been found possible to grow
vegetation on almost every spoil type. Increasingly it has become
apparent that technical solutions are available or can be developed
through application of well established methods. The major reclamation
difficulties are not primarily of a biological nature – with the notable
exception of the treatment of tailings. Most of the difficult
biological situations are a matter of engineering technique; the need is
that the wastes be so arranged as to permit them to sustain vegetation.

This, of course, is not to say we have solved our reclamation problems
or even, as a Province, have met our responsibilities. Our problems are
not confined to science and technology. Having said that, I must go on
to say that from my vantage point it appears that we have made very
significant advances in these regards in the last year or eighteen
months.

Nevertheless, I was glad to hear Marc Bell's comments on the need for
research into the institutional problems, for, from the outset, in forestry,
we have recognized that although the site/plant relationships are important
and these have featured largely in our programme, our areas of concern ex-
tend beyond these. Much of our earliest efforts were directed towards
identifying the essential institutional and organizational requirements
for effective reclamation and in establishing the inter-relationship between the extraction and reclamation phases of mining. Indeed, one of the earliest studies completed was a master's thesis by J.L.F, Hogg on "Natural Resources Policy, Law and Administration with respect to Mineral Exploration in British Columbia". The need to integrate reclamation and extraction through planning and the modification of mining techniques, rather than to look on reclamation as something to be done when the real business of mining is completed, is commonplace today, even if perhaps it is still more often honoured in theory than in practice, but a few years ago this was a radical suggestion.

Nevertheless, I believe the institutional and planning aspects are still today the areas of greatest constraint on effective implementation of provincial reclamation policy.

There is also the question of off-site or downstream effects. Often we tend to be preoccupied with the mine site. I recall that it was several years before there was any awareness of the significant adverse effects of poorly planned and ill-considered exploration activities. The overall regional impact of mining must be of major concern.

Another early concern was the lack of provision for information exchange, arising out of the professional and geographical isolation of the relatively small number of people active in reclamation practice and research. There was a clear need to provide for information exchange and intercommunication. Furthermore, we soon found that this was not a problem confined to British Columbia or even Canada, but was world-wide. To assist information flow we started the Reclamation Research Newsletter and Bibliography under the auspices of the International Union of Forest Research Organizations. In six years the mailing list for this newsletter increased from 18 to some 400 workers in 30 countries, until in 1975, our coming together with the Ontario Cover Crop Committee based at the University of Guelph resulted in the founding of the Canadian Land Reclamation Association to provide an interdisciplinary meeting-ground for all
concerned with land reclamation. This is a pioneering effort and is the first such society in the world. One of its major purposes is the publication of the Reclamation Review, an international interdisciplinary journal, to continue and extend the role of the U. B. C. Reclamation Newsletter. Unfortunately, because of inflation, major difficulties are being encountered by the Editorial Board with the publishing arrangements. Incidentally, the annual meeting of the Canadian Land Reclamation Association this year is being held in Edmonton.

To summarize, in Forestry, we have tended to look at Reclamation from the viewpoint of the biologically-oriented land or natural resource manager. We have seen mining, not as a final land use, but as a temporary or intermediate use, and our concern has been with the bringing back of the site to productive uses compatible with regional patterns.

Foresters may perhaps be characterized by their primary concern with the management and manipulation of vegetation and land-based resources. Roger Berdusco's paper well shows the contribution that Forestry can make to Reclamation. We are concerned with practical application and the maintenance of productivity; with husbandry rather than cosmetic reclamation - the green lie. We are conditioned to approach the matter from the standpoint of classical land management planning, the elements of which have been defined in a forestry context as follows:

1. A specified management period.
2. Initial collection of facts and a description of the area to be managed.
3. Analysis of the facts and an assessment of management options.
4. Designation of management options.
5. Design of a programme to accomplish the objectives.
6. Record of results, collection of facts by inventory and research to be used in formulating the plan for the next management period. (Osmaston 1968).
Consequently we have been predisposed to support the approach advocated by Tony Milligan yesterday, that of advance through the conduct of field scale reclamation allied with on-going research to resolve problems as they become apparent. Perhaps this is a pragmatic approach and one that, in purest terms, is not particularly elegant, but it has been proven effective throughout the history of the evolution of land management, provided always that the practice is intelligently conceived and applied and that due attention is given to the all important maintenance of records of work done and results obtained. This is not to say, of course, that more basic approaches are not highly important. The current work on tailings by Bob Gardiner and Les Lavkulich provides an example of the kind of situation where this is vital if advances are to be made. Paul Ziemkiewicz is currently undertaking a study of nutrient cycling in high elevation reclamation ecosystems that will provide important information regarding the stability of the vegetation we are establishing.

Reflecting the approaches of our profession we are interested in resource policy; the resolution of resource and landuse conflicts; regional or area planning and impacts; the development of clear management objectives; long term and operational planning to achieve these objectives in a rational manner; economic evaluation; site categorization; the development of working techniques; problems of species selection and evaluation; the trial of introduced and native species; the establishment of vegetation, its maintenance and final use; natural succession; questions of watershed management and silt control; provision of wildlife habitat; the amelioration of visual impact - in a word, all the landuse problems that result from the physical impact of mining.

To the solution of these problems we can bring to bear the knowledge, methodologies and experience that has been gained in forestry over the past two hundred years in the treatment of steep unstable soils in rugged landscapes. Although in British Columbia most forestry activities
have been directed to timber production it is important to remember that there is a long tradition of protection or rehabilitative forestry with emphasis on the stabilization and restoration of degraded sites, often in severe environment under mountainous conditions. This expertise in soil and water conservation and environmental rehabilitation, when coupled with the broadened concepts of wild land resource management of the latter part of this century, are directly applicable to mined land reclamation.

A final, but general, value of university involvement is that, to a greater extent than government or industry, we can, and should, take an independent stance.

I have only reported in very general terms on our programme but I believe that the successes achieved have indicated what can be done by a small group, and the potential that exists for close co-operation between government, industry and university and the mutual benefits that can result to all parties. There are only a few people involved in this important task of mined land reclamation and it behooves us all to develop mechanisms to maximize our joint contributions.

1. Osmaston F.C. The Management of Forests
   George Allen & Unwin. 1977

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