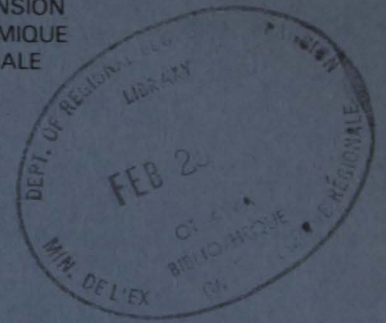




DEPARTMENT
OF REGIONAL
ECONOMIC
EXPANSION

MINISTÈRE DE
L'EXPANSION
ÉCONOMIQUE
RÉGIONALE



TOWARDS INTEGRATED RESOURCE MANAGEMENT



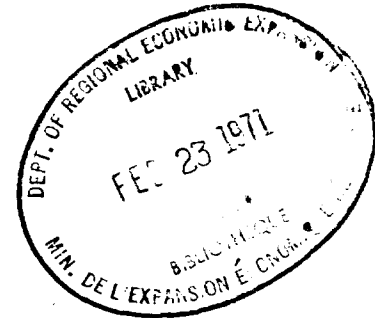
REPORT OF THE SUB-COMMITTEE
ON MULTIPLE USE,
NATIONAL COMMITTEE ON
FOREST LAND

PRINCIPAUX COMMENTAIRES
ET RECOMMANDATIONS

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**TOWARDS
INTEGRATED
RESOURCE
MANAGEMENT;** *report.*

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REPORT OF THE SUB-COMMITTEE
ON MULTIPLE USE,

Canada = NATIONAL COMMITTEE ON
FOREST LAND, *Sub-Committee on Multiple Use.*

PRINCIPAUX COMMENTAIRES
ET RECOMMANDATIONS

Prepared for the Meeting of the
National Committee on
Forest Land
Held in Quebec, P.Q.,
May 26-30, 1969

CHAIRMAN
W.W. Jeffrey

MEMBERS
C.S. Brown
M. Jurdant
N.S. Novakowski
R.H. Spilsbury

Published under Authority
Minister of Regional Economic Expansion

INTRODUCTORY NOTE

The National Committee on Forest Land reported through the Canada Land Inventory (CLI) to the Deputy Minister of Forestry and Rural Development from its inception to July, 1969, and since then to the Deputy Minister of Fisheries and Forestry. This report was prepared while the National Committee was reporting through the Canada Land Inventory. CLI is now part of the Department of Regional Economic Expansion.

The report has been edited, and updated very slightly, from the original for this printing. A French translation of the key comments and recommendations has been added.

A condensation of the report has been accepted by the Forestry Chronicle for publication.

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INTRODUCTION

In February 1967, the National Committee on Forest Land approved the formation of the Sub-Committee on Multiple Use with the following members:

W.W. Jeffrey (Chairman)	Associate Professor of Forestry Hydrology, Faculty of Forestry, University of British Columbia, Vancouver.
C.S. Brown	Recreation Resource Advisor, Resource Development Division, Department of Regional Economic Expansion, Ottawa.
M. Jurdant	Research Scientist, Department of Fisheries and Forestry, Forest Research Laboratory, Sillery, Quebec.
N.S. Novakowski	Staff Specialist, Mammalogy, Canadian Wildlife Service, Department of Indian Affairs and Northern Development, Ottawa.
R.H. Spilsbury	Forester-in-Charge, Research Division, British Columbia Forest Service, Victoria.

The Sub-Committee's terms of reference were defined as follows:

- (a) to review, evaluate and adapt concepts and applications of multiple use and integrated resource management;
- (b) to relate these to the Canada Land Inventory (CLI) and other land classification systems;
- (c) to report periodically to the National Committee on Forest Land;
- (d) to make recommendations concerning "multiple use" and "integrated resource management" and their relationships to land management.

Work Undertaken

In the period of 1967-69, the committee members exchanged documents, and two specific studies were undertaken in accordance with the terms of reference.

The first study is "Land Use History of the Sayward Forest" by R.J. Pearson. He has prepared a Bachelor of Science, Forestry, thesis that is now available at the University of British Columbia. The second study is "Conceptual Bases, Philosophical Foundations and Administrative Procedures for Multiple Use Management of Natural Resources" by D.A. Smith who is undertaking the Master of Forestry course at the University of British Columbia (UBC). This thesis was completed in late 1969. Both studies are supported by funds from UBC and the Canadian Wildlife Service.

The report that follows is based on a meeting of the Sub-Committee held in Vancouver on March 5-6, 1969.

KEY COMMENTS AND RECOMMENDATIONS

Concepts

Constantly accelerating changes in society, environment and technology are generating strong, public concern about Canada's resources and environment. This situation coincides with a new awareness of social needs in these fields.

A growing population and social trends are increasing demands on wildland resources. Without integrated resource management designed to satisfy these demands efficiently, public enjoyment of wildlands may be attained only through the inefficient use, or misuse, of some resources, thus aggravating the "resource" problem.

Alternatively, "poor use" resulting from insensitive and inappropriate management may lead to public reaction, which in turn, at public insistence, may result in extremely conservative management.

This does not mean, however, that direct economic returns from resources are unimportant.

The main factors that work against the implementation of integrated resource management are in the social, political, economic, legal and administrative realms, rather than in technology. It is here that attitudes and opinions play an important role.

Definitions

The term "integrated resource management" is preferred to "multiple use". Integrated resource management is, fundamentally, a social concept.

"Use" is not restricted to "commodity use", but includes "vicarious use", or -- paradoxically -- "non-use". Land is of two categories, "multi-purpose" and "limited purpose". The need for the latter may actually expand as society develops.

We recommend adoption of the following as the definition of integrated resource management: "The application of management strategies to achieve the maximum output from the optimized use of natural resources of a specific area for the benefit of a referent-group and its successors."

The implementation of integrated resource management requires: (a) a definition of management areas for rational management; (b) consideration of referent-group needs in such areas; (c) administrative mechanisms to allow adequate planning and the translation of integrated resource management plans into practice.

Environmental Quality

Consideration of the environmental quality -- the interaction in integrated resource management -- is basically social in nature. It is suggested an acceptable quality of natural environment is a basic human right. Environmental quality guidelines are urgently needed. Recognition that a quality-environment is a basic human need, and a right, makes the creation of "environmental quality guidelines" an urgent necessity and a federal government concern.

Legislation - Land Tenure

Resource legislation, typically, deals with a single resource, rather than with the combined production of resources. Legislation is often internally contradictory and inadequate. Legislative compartmentalization is typical and has divisive effects.

Within some jurisdictions existing laws may debar all but the members of professional forester associations from becoming integrated resource managers.

We (the Sub-Committee) recommend a historical evaluation of resource legislation in relation to its impact upon resource management throughout Canada. Similarly, we recommend an evaluation of existing legislation and its effects upon progress towards integrated resource management.

It is understood that the Canadian Council of Resource Ministers (CCRM) is considering a survey of legislative authorities and management practices relating to land at all jurisdictional levels. We recommend that the National Committee on Forest Land keep current on this and similar studies by the CCRM.

Legislation designed specifically to encourage integration in resource management is needed at all government levels.

Land tenure is a significant factor in the implementation of integrated resource management. Some public lands are quasi-alienated. There is no guarantee that industrial and public interests coincide in the management of these lands, or that under existing land tenure arrangements management for maximum public welfare can be achieved.

When conflicts in interest arise, the common solution of adjustment by governmental ad hoc administrative fiat is an inadequate public safeguard, and may, as well, inflict injustice upon industry.

Reconciliation of corporate and public interests in the management of quasi-alienated public lands is difficult. A possible mechanism may be the appointment of an ombudsman or commissioner in major jurisdictions to ensure that delegated public lands are managed in the public interest.

Over-dependence by governments upon Order-in-Council may hinder progress towards integrated resource management.

Institutional Organization within Government

Present organization in government along single resource lines is inappropriate to integrated resource management. It inhibits development of the inter-disciplinary, functionally-oriented resource management teams needed. This compartmentalization is a reflection of legislative compartmentalization. Members of the Sub-Committee recommend:

- documentation of the present situation, with regard to institutional organization within government, accompanied by historical analysis showing how the present situation developed;
- that the National Committee on Forest Land request the CCRM to undertake this study. If this is not possible, the study should be done via a task force approach, and not through the inadequate mechanism of a "voluntary committee";
- that the National Committee on Forest Land request the CCRM to consider this and allied problems in its preparation for the proposed 1972 CCRM conference on renewable resources.

The formation of a "Renewable Resources Council of Canada" (cf. Economic and Welfare Councils of Canada) merits consideration

by government. Another possibility is a stronger "commission" mechanism (cf. Grain Commission, Board of Transport Commissioners).

Land Use Planning

There is a lack of planning for integrated resource management; its absence has retarded progress. Planning, integrated resource management and specialized management for individual resource products are all closely related and interdependent.

The term "area planning" is preferred to "regional planning". Area planning in many circumstances may require rationalization of management areas and boundaries.

Institution of area planning will require an increased professional staff. A shortage of professional staff now limits the establishment of integrated resource management.

Area planning may create a need for a new type of resource specialist. It may mean less delegation of management responsibilities to industrial concerns.

Land Classification

Land classification is closely linked to area planning. The proposed biophysical land classification is a promising planning base. We support the development of land classification schemes along these lines.

We recommend the adoption of pilot projects in area planning, using biophysical land classification data. We also commend and wish to encourage the Canada Land Inventory (CLI) effort of land capability mapping, and express the hope that CLI data will be fully used in area planning schemes.

We recommend that the Sub-Committee on Land Classification explore the potentialities of a composite classification for "use integration requirement".

Research

More effort is required in studying the economies of integrated resource management. A significantly increased effort in the sociological and political science aspects of integrated resource management is also needed. And as well, more legal research into resource questions.

No federal agency has a clear legislative mandate for outdoor recreation research with respect to multi-purpose lands. This is also true of research into integrated resource management itself. This situation should be corrected.

In integrated resource management research, the tools of systems modeling and computer simulation seem very powerful. We recommend that the Government of Canada establish (two to four) research projects in integrated resource management. These projects should bring together multi-disciplinary task forces to consider worthwhile, pertinent research. These would be pilot research projects, in integrated resource management, working towards the creation of new, composite technologies.

Education

In education, the implications of integrated resource management are being studied by the Sub-Committee on Resources Education, National Committee on Wildlife Lands. We recommend close liaison with this group.

Resources education in Canada has tended to be narrowly specialized and uni-disciplinary. This has produced competent trained, but perhaps overly-inhibited graduates. The alternative, producing broadly-based managers of resources is also hazardous.

Superior resources graduates have usually acquired: a good fundamental science base; certain minimal professional tools; and a strong problem-solving ability. Curricula centred around these goals are most likely to succeed.

Courses that stress common resources concepts, i.e., "principles" courses, are particularly worthwhile.

Integrated resource managers are leaders, and are difficult to pre-select at the undergraduate level. They may come from any field of science or resource specialization, equipped through the fusion of an inter-resource research capability developed in graduate school, and undergraduate schooling previously acquired.

Continuing education and "retraining" is needed, as is closer interaction between university and government.

General

We recommend that the content and recommendations of this report be widely disseminated, in particular to CCRM, to provincial and federal officials, and to the National Committee on Wildlife Lands.

We further recommend that the Chairman, National Committee on Forest Land, seek to have a condensed version published in the Forestry Chronicle, so as to bring the report to the attention of the forestry profession at large, and to take other measures that he deems appropriate for disseminating the report findings.

We request that the National Committee on Forest Land consider,
with a view to acceptance, the content and recommendations of our report.

PRINCIPAUX COMMENTAIRES ET RECOMMANDATIONS

CONCEPTS

Les changements toujours accélérés de la société, du milieu environnant et de la technique font naître dans le public un intérêt accru pour les ressources et l'environnement. En même temps de nouveaux besoins sociaux naissent en ces domaines. Le tout est le reflet d'une réalité politique très importante.

L'accroissement de la population et les besoins plus grands de la société augmenteront les exigences vis-à-vis des ressources naturelles. En l'absence d'un aménagement intégré, le public pourra être amené à satisfaire ses besoins au détriment de certaines ressources, et les problèmes risquent alors de se multiplier. D'un autre côté, une utilisation inappropriée - aux yeux de la masse - peut résulter d'une administration trop peu sensibilisée ou inadéquate et causer une réaction générale qui, à son tour, peut susciter des mesures trop conservatrices, sur les instances mêmes du public. Toutefois, un bon aménagement reconnaît aussi bien les exigences économiques que les besoins sociaux.

Les principaux facteurs qui empêchent la réalisation d'un aménagement intégré sont plutôt d'ordre social, politique, économique, légal et administratif que d'ordre technique, car les prises de position, les préjugés et l'opinion y jouent un rôle important.

DÉFINITIONS

Le terme "aménagement intégré des ressources" est préféré à celui "d'utilisation à des fins multiples". L'aménagement intégré des ressources est au fond un concept social.

"Utilisation" ne signifie pas simplement "utilisation productive", mais aussi "simple jouissance", ou encore, paradoxalement, "inutilisation". Les terres sont de deux sortes: "à vocation multiple" et "à vocation limitée". Le besoin de cette dernière peut en fait augmenter à mesure que la société se développe.

Nous recommandons l'adoption de la formule suivante comme définition de l'aménagement intégré des ressources:

- "l'application des tactiques de gestion en vue d'obtenir le maximum de rendement par l'utilisation la meilleure possible des ressources naturelles d'une superficie donnée, pour le bénéfice d'un groupe intéressé ou de ses successeurs".

Pour réaliser un aménagement intégré des ressources, il faut:

- déterminer les aires géographiques où l'on appliquera une gestion rationnelle;
- considérer les besoins du groupe intéressé dans ces périmètres;

- avoir les organismes administratifs qui puissent permettre une planification adéquate et la mise en pratique des plans d'aménagement intégré des ressources.

QUALITÉ DU MILIEU ENVIRONNANT

La considération de la qualité du milieu environnant - résultat de toutes les activités d'un aménagement intégré des ressources - est au fond et par nature une considération sociale. On estime qu'une qualité suffisante et acceptable du milieu vital est un droit humain fondamental. On a un besoin immédiat de règles pour l'appréciation de la qualité du milieu. Cette question du milieu touche à un besoin humain fondamental et à un droit humain et il en résulte, semble-t-il, que c'est une question à traiter nécessairement sur le plan fédéral.

LÉGISLATION - RÉGIME FONCIER

La législation traite de chacune des ressources séparément plutôt que de leur administration conjointe. Souvent, elle comporte des contradictions internes ou bien elle est inadéquate. Cette législation compartimentée, typique, cause des conflits. Dans certaines juridictions, les lois existantes peuvent interdire à quiconque, sauf aux membres des associations professionnelles forestières, de se charger de l'aménagement intégré des ressources.

Nous recommandons:

- une évaluation historique des lois sur les ressources, en relation avec leur impact sur l'aménagement des ressources à travers le Canada; un examen semblable des lois actuelles et de leurs effets sur une évolution progressive vers un aménagement intégré.

On croit que le Conseil canadien des ministres des ressources envisage une enquête sur les pouvoirs législatifs et les pratiques d'aménagement à tous les niveaux de juridiction.

Nous recommandons:

- que le Comité national des terrains forestiers se tienne au courant de cette enquête et de toute autre étude semblable du Conseil.

Une législation conçue spécialement pour encourager l'intégration dans l'aménagement des ressources est nécessaire à tous les niveaux de gouvernement.

Le régime foncier est un élément important à considérer si l'on veut réaliser un aménagement intégré des ressources. Certaines terres publiques sont quasi aliénées. Il n'y a aucune garantie que les intérêts industriels et ceux du public coïncident lorsqu'il s'agit de l'aménagement de ces terres, ou que - sous les arrangements actuels de régime foncier - on peut arriver à l'aménagement le plus profitable au bien public.

Lorsqu'il y a conflit d'intérêts, la solution habituelle d'un règlement par décision administrative du gouvernement, pour le cas en cause, ne sauvegarde qu'imparfaitement l'intérêt du public et peut parfois être injuste pour l'industrie.

La conciliation des intérêts des sociétés et de ceux du public est difficile lorsqu'il s'agit de terres quasi aliénées. Un moyen possible pourrait être la désignation d'un ombudsman, ou commissaire, dans les juridictions plus importantes, qui assurerait que les terres publiques laissées à la disposition des sociétés privées soient aménagées dans l'intérêt du public.

Le recours trop exclusif aux décrets gouvernementaux peut nuire à l'avènement d'un aménagement intégré.

NOMBREUX ORGANISMES DISTINCTS AU SEIN DU GOUVERNEMENT

L'approche fragmentée suivie par l'organisation gouvernementale actuelle ne semble pas convenir à un aménagement intégré des ressources et empêche la formation d'équipes inter-disciplinaires fonctionnellement orientées vers l'aménagement des ressources. Ces cloisonnements résultent de la fragmentation des lois.

Nous recommandons:

- de dresser une documentation sur la situation actuelle quant aux nombreux organismes gouvernementaux distincts et de faire une analyse historique montrant comment on en est arrivé à la situation présente;
- que le Comité national des terrains forestiers prie le Conseil des ministres des ressources d'entreprendre cette étude, car une telle étude devrait être faite par un groupe bien qualifié et non par le truchement inadéquat d'un "comité de volontaires";
- que le Comité national des terrains forestiers demande au Conseil des ministres des ressources d'examiner ce problème et les problèmes connexes à sa conférence sur les ressources renouvelables prévue pour 1972.

La formation d'un "Conseil des ressources renouvelables du Canada" est une question qui mériterait d'être étudiée par le gouvernement (Cf. Conseils économiques et bien-être du Canada). Une autre façon de procéder serait de nommer une "commission" qui est un mécanisme plus puissant (Cf. Commission des grains, Commission des transports du Canada).

PLANIFICATION DE L'UTILISATION DES TERRES

Il n'y a pas de plan d'aménagement intégré des ressources, et l'absence de cet élément crucial a retardé le progrès. La planification, l'aménagement intégré des ressources et l'aménagement spécialisé à des fins propres à chaque ressource sont étroitement reliés et interdépendants.

Le terme "planification par zone" est préféré à "planification régionale". La planification par zone en de nombreux cas peut demander une répartition rationnelle des superficies et des périmètres d'aménagement.

L'institution de la planification par zone exigera un nombre plus grand de cadres qualifiés. Le manque d'un tel personnel limite actuellement les possibilités d'aménagement intégré des ressources.

La planification par zone peut créer un besoin de spécialistes des ressources d'un type différent du type actuel. Elle peut signifier une diminution du transfert des responsabilités d'aménagement aux entreprises industrielles.

CLASSIFICATION DES TERRES

Le classement des terres est étroitement lié à la planification par zone. La classification envisagée est de caractère bio-physique et pourrait servir d'excellente base à la planification. Nous encourageons donc la mise en application d'un tel genre de classification.

Nous recommandons:

- l'établissement de projets-pilotes de planification par zone, basés sur les données du classement bio-physique des terres.

Nous apprécions et encourageons l'effort déployé par l'équipe de l'Inventaire des terres du Canada pour dresser les cartes des possibilités des terres, et nous formulons l'espoir que les données de l'Inventaire soient pleinement utilisées dans les projets de planification par secteur.

Nous recommandons:

- au sous-comité de classification des terres de voir ce que l'on peut tirer d'une classification mixte du "besoin d'utilisation intégrée".

RECHERCHE

Dans la recherche, un plus grand effort est nécessaire dans l'étude des conséquences économiques d'un aménagement intégré des ressources. Il est justifié d'accorder une attention accrue à l'aménagement intégré des ressources vu sous l'angle des sciences sociologiques et politiques. On a besoin de beaucoup plus de recherches juridiques que de sujets des ressources.

Aucune agence fédérale n'a un mandat législatif bien défini pour effectuer des recherches concernant la récréation de plein air sur les terres à vocation multiple. C'est également vrai de la recherche sur l'aménagement intégré des ressources en lui-même. On devrait remédier à ces déficiences.

Dans la recherche sur l'aménagement intégré des ressources, on a des instruments qui semblent très puissants, à savoir les modèles et les simulateurs.

Nous recommandons:

- que le gouvernement du Canada mette sur pied quelques projets portant sur l'aménagement intégré des ressources.

Ces projets réuniraient des équipes multi-disciplinaires pour aborder les problèmes particuliers et produire une recherche valable et appropriée. Il s'agirait de modèles de projets de recherche sur l'aménagement intégré des ressources, dont l'aboutissement serait le développement de nouvelles technologies mixtes.

ÉDUCATION

En ce qui concerne l'éducation, les conséquences d'un aménagement intégré des ressources font l'objet d'une étude par le sous-comité de l'éducation sur les ressources, du comité national des terres incultes.

Nous recommandons:

- une liaison étroite avec ce groupe.

L'éducation sur les ressources, au Canada, a eu tendance à rester étroitement spécialisée et limitée à une seule discipline. Il en est résulté des diplômés compétents, mais peut-être trop timides. L'autre solution, qui consiste à préparer des gestionnaires des ressources à formation plus large, présente aussi des risques.

Les titulaires de diplômes d'études supérieures sur les ressources sont censés avoir acquis:

- une bonne base scientifique;
- un minimum d'aptitudes professionnelles;
- une forte compétence dans la solution des problèmes.

Des critères orientés vers de tels objectifs ont, à notre avis, les meilleures chances de succès.

Les cours couvrant les concepts communs à toutes les ressources, i.e. les cours de "principes" sont considérés particulièrement formateurs.

Les responsables de l'aménagement intégré des ressources sont des chefs, et par conséquent il est difficile de les choisir à l'avance avant l'obtention de leur diplôme. Ils se révèlent d'eux-mêmes avec l'acquisition de l'expérience.

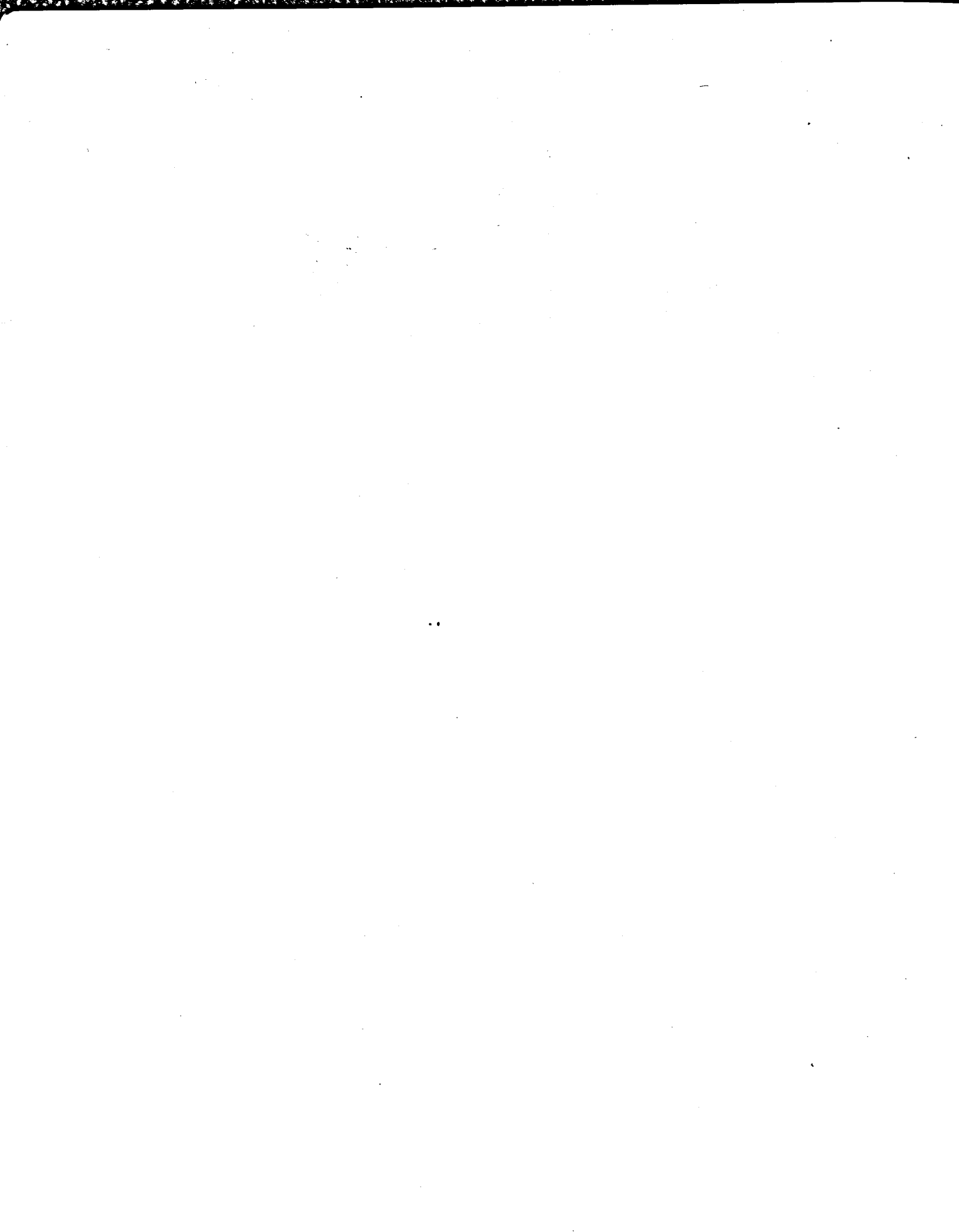
Les chercheurs en aménagement intégré des ressources peuvent venir de n'importe quel champ de spécialisation en science ou en ressource, grâce à la fusion des facilités de recherches d'une ressource à l'autre disponibles chez les diplômés ou acquises antérieurement au niveau "sous-diplômé".

Il s'agit d'une formation continue et toujours à refaire et d'une coopération toujours plus étroite entre l'université et le gouvernement.

GÉNÉRALITÉS

Nous recommandons une très large diffusion du contenu et des recommandations du présent rapport, en particulier au Conseil des ministres des ressources, aux autorités provinciales et fédérales et au Comité national des terres incultes. Nous recommandons en outre au président du Comité national des terrains forestiers de chercher à faire publier une version condensée du rapport dans la revue "Forestry Chronicle" pour assurer sa diffusion parmi tous les forestiers de profession et de prendre toute autre mesure jugée appropriée pour faire connaître la teneur de ce rapport.

Nous demandons que le Comité national des terrains forestiers examine, dans l'intention de l'accepter, le contenu et les recommandations de notre rapport.



TOWARDS INTEGRATED RESOURCE MANAGEMENT

UNDERLYING ASSUMPTIONS

With the increasing size, affluence, mobility and leisure time of North American populations, demands upon wildland resources will increase. If integrated resource management is not implemented, public enjoyment of the wildlands, in a number of ways, may be pursued at the expense of some resources, thus continuing to aggravate the problems.

Alternatively, lack of resource management integration may engender what is publicly regarded as "poor" use (i.e., use not attuned to public needs) and will lead to public reaction or resource catastrophe, followed finally by extremely conservative management enforced as a result of public insistence.

While real difficulties exist in determining the optimum combinations of benefits from specified areas, there can be little doubt that the main factors retarding the implementation of integrated resource management lie, not at the technological level, but rather at the social, political, economic, legal, administrative and other levels. A major obstacle is the lack of data for planning and analysis. (This is not to gainsay the existence of real problems at the technological level, but rather to place them in their proper current perspective.)

It is usually thought that the successful implementation of integrated resource management will result from action taken in the field.

We would like to stress our view that the overriding needs in integrated resource management and the crucial retarding factors exist, not in the field, but primarily in administrative centres of government. This belief has strongly influenced our report.

We believe that no real advance in integrated resource management will result from philosophical musings, but will only emerge from a clear appreciation by land managers of the prerequisites of integrated resource management. This implies consideration of such matters as:

- social factors;
- departmental organization within government;
- environmental quality goals;
- land tenure considerations;
- the importance of planning;
- professional staffing levels;
- appropriate research needs.

Though not an all-inclusive list, it serves to illustrate the nature and scope of our concern. We believe that these are the factors to consider, rather than such questions as: "Does multiple use mean all uses on one acre, or alternatively, all uses within a management unit?" The latter type of question is not trivial, but is of less immediacy than the considerations listed above.

Accordingly, we deal only briefly with the conceptual and philosophical implications of "multiple use" and "integrated resource management". Mr. Smith's thesis will soon be available and, allied with information from Mr. Pearson's work, will form a good basis for evaluation.

The Role of Social Factors

This is a time of rapid social, environmental, and technological change. And the rate of change is constantly accelerating. In this change can be seen the beginnings of a strong social concern over the goals of our society, and the environment created by our technology. Though no easy answers are forthcoming, the public at large is becoming aware that such problems exist. This, as yet, subliminal awareness of change, and its effects upon resources and living space will give rise to a more vocal public concern.

Such public awareness and concern represent a political fact of life with which we must learn to live. It will affect funding for management and research, the administrative tasks entrusted to managers, the institutional structure of resource management, and even the very goals of resource management. Thus, a rising awareness of change, along with deeply-felt social needs, will create a powerful political presence.

Traditionally, resource departments - as well as resource people - have been developed along single disciplinary lines. The social factors mentioned indicate a necessary evolution towards multi-disciplinary and coordinated management. Yet the historical momentum is entirely in the other direction. The changes overtaking us are likely, therefore, to create uneasiness, confusion and disorientation. We must, accordingly, look realistically at integrated resource management, to place attention squarely upon the primary difficulties.

Resources meet both the industrial-economic and social-environmental needs of society. This report stresses the social factors. To avoid misunderstanding, we explicitly state that the relatively lower level

of attention devoted herein to industrial-economic needs is in no way intended to imply lack of recognition of those needs, or of their necessity to society.

We feel, however, that the commodity-uses and the direct economic returns from resources are well-recognized and understood by resource management practitioners. We feel equally, that awareness of social factors tends to be less well-developed. Thus the orientation of our report.

Nevertheless, we again emphasize that the reconciliation of industrial-economic and social-environmental needs is a basic assumption on our part. The attention devoted to the latter group of factors has meaning only within that assumption.

Scale of Effort Required

This Sub-Committee is only one of several looking into various types of resources integration. This fact alone is indicative of our social evolution.

To introduce our concern over the implementation of integrated resource management, we would like to stress how ludicrous it is, in relation to the need we perceive and try to articulate, that this Sub-Committee (composed of persons already fully committed to other jobs, working without assistance, without research capability and without funding) should be regarded as a major step towards a higher level of integrated resource management practice.

We hope clearly and conclusively to show how inadequate is this Sub-Committee for its task. We hope that from such realization will come pressure and impetus for more appropriate, more powerful developments.

We state, unequivocally, that if the implementation of integrated resource management has to rest much longer upon the goodwill and capacities of committees such as ours, then resource management in Canada is in for heavy weather.

PHILOSOPHY AND CONCEPTS

It has long been recognized that wildlands yield a multiplicity of products. (The literature of both the United Kingdom and France in the mid-1600's showed awareness of this.) However, the task of reconciling the often conflicting needs of optimal production of the individual resources in the same area may be very complex. This complexity is probably a main reason why resource management has evolved along lines of single resource specialization, rather than towards development of a composite technology that optimizes joint production of all resources.

In the United States, following the flowering of the conservation movement in the late 19th century, the principle that has reconciled resource management conflicts on public lands is traditionally "the greatest good for the greatest number, in the long run". It is too well-known to require expansion. When this principle is analyzed, however, it appears to embody little more than political rhetoric. There is no definition of "good"; the population from which the "greatest number" must be considered is equally undefined; and how long is the "long run"? Yet integrated resource management, by definition, must embody maximization of the public welfare as a central tenet.

Therefore, consideration of integrated resource management must begin with fundamental questions. And the most important of these questions is: "With what objective does one manage wildland resources?" One may

answer, "To achieve, from natural resources, that output of goods and/or services which maximizes the public welfare." In other words, natural resources are not ends in themselves, but only have meaning in relation to the population which they serve. This idea is, of course, contrary to our traditional resource management training in many respects.

The term "integrated resource management" is preferred to "multiple use". The latter term has acquired over the years so many different meanings, in so many different resource areas and groups, as largely to have lost the meaning.

On the basis of such considerations, the Sub-Committee recommends adoption of a definition of integrated resource management proposed by D.A. Smith, namely, "The application of management strategies to achieve the maximum output from the optimized use of natural resources of a specific area for the benefit of a referent-group and its successors."

In this definition, "management strategies" means a long-term view. "Maximum output from the optimized use", means the optimum combination of uses of an area's resources, each being managed within the limits of sustained productivity. The term "specific area" means that the world has to be divided into management units; a "specific area" is one such unit.

The term "referent group" means that each such area is to be managed for the benefit of a population, in some way defined. Definition of the referent-group is important since different populations have different objectives. The referent-group does not necessarily mean the inhabitants of a local area. When the interests of a national population are clearly at variance with those of a local or regional population, as a matter of faith, it is assumed that the national population's interests are paramount.

"Use" is not considered restricted to "commodity use", since, for a significant proportion of the population, "use" also means "vicarious use". The impetus for the creation of the United States Wilderness System came from large urban-centred populations who did not personally use wilderness areas, but who, in some manner, derived vicarious satisfaction from knowing that wilderness areas existed. Such a valid expression of public preference has to be taken into account in resources policies. Thus the word "use", paradoxically, includes "non-use".

Land is divisible into two general categories. The first category is "multi-purpose land" managed for a variety of products. Most of the land within any country falls within this category, and is the land upon which integrated resource management is applied. The second class is a smaller one, of "limited purpose land", on which uses are severely restricted in accordance with an overriding policy. National parks are an example of this land category. Objections to the existence of these second category lands are in practice seldom wholly defensible, since, in the future, if economic and population pressures dictate that these limited purpose lands be absorbed into the larger category of multi-purpose lands, this can be done. That option remains open, while the converse doesn't. It also has to be recognized that limited purpose lands may increase in importance as populations expand.

Holland is one of the most densely populated countries in the world. In spite of strong population pressures upon its land resources¹ it has 40 per cent of its reclaimed land presently devoted to amenity.

¹Personal communication from Dr. V.E.F. Solman and Dr. P. Meyboom.

There have been many debates in the past over the terms of "primary use" and "secondary use". While useful, these terms have desirable connotations. They tend to establish a present value judgment as a perpetual and immutable fact.

In addition to the terms "primary use" and "secondary use", there are other terms such as "economically dominant use", "socially dominant use", "priority use", etc. These are imprecise and bring up questions concerning the bases for evaluation embodied in such terms. They avoid recognizing that changing social conditions may bring changes in priorities of use.

EXAMPLES OF INTEGRATED RESOURCE MANAGEMENT

Integrated resource management is not entirely a theoretical concept. It is being applied and implemented with varying levels of intensity in some areas, as these examples show.

U.S. Forest Service

This service manages the National Forests of the United States (Cliff, 1960) and is in a very favoured position to carry out integrated resource management. It has specified areas and relates to a national referent group, the American people. In addition, a most important factor is its ability to do its job under the umbrella of a single agency responsible for virtually all resources.

This last factor, i.e., a single administration responsible for a varied resource base, is a most telling advantage. Theoretically, at least, all resources are given equal consideration. When conflicts arise concerning resources, they can be rationally resolved in accordance with a single administrative goal. In other words, conflict at the administrative level is, at most, at a rather low intensity compared with the Canadian situation where individual resources tend to be in the hands of different agencies, each with a vested interest in maximizing benefits from one resource.

Tennessee Valley Authority

The Tennessee Valley Authority (TVA), established in 1933, is another example of operative integrated resource management (McKinley, 1950). Though the TVA was established initially to solve problems of flooding, irrigation and navigation, over the years its responsibilities were modified. Now one of its major aims is defined as bringing about the integrated development of the natural resources of the Tennessee Valley area. The TVA is a federal agency with federal powers, but it deals with local affairs, plans, administrations and management. Again, this agency has the benefits of working in a specified area for a specified referent-group. It enjoys the powerful factor of being one management agency charged with attainment of a single goal from a broad resource base.

Delaware River Basin

In the Delaware River Basin (Martin et al. 1960), the motivation for action developed from concern with water problems and the need for coordinated use of the Delaware River. At the beginning of the project, 18 federal agencies were involved in water management. There was, then, little collaboration between them. Primary emphasis in the Delaware River example lies in river control. It is obvious, however, that the more comprehensive such a multi-purpose water plan becomes, the more it has to consider the other resources of the basin. Integrated resource management of the basin therefore becomes increasingly important.

The Delaware River Basin had a specified area and a referent-group. But it had to set up its own administrative formula for management. Exhaustive study was made of administrative factors. Martin et al. (1960)

said, "Care should be exercised in creation of new government which, however justified in theory, must be considered with reference to its potential effects and prospective relations with existing governments. This point is subtle, though significant, for responsible action requires that due consideration be given to all relevant factors before moving to the establishment of a new form of administration." The study recommended a type of federal, inter-state compact, with substantive powers for policy formulation and implementation.

Experience in Canada

Canadian experience in integrated resource management is scarce. The Conservation Authorities in Ontario (Richardson & McMullen, 1961) are probably the best known example. Impetus for their formation was a need to alleviate water problems. The Conservation Authorities have had the three component factors of specified area, referent group, and co-ordinated administration operating in their case also.

Common Factors of Experience to Date

For the implementation of integrated resource management, three major factors are extremely important. These are:

- definition of areas for administrative implementation of integrated resource management on a rational basis;
- consideration of the needs of a referent-group for whom the resources of this specified area are to be managed;
- administrative mechanisms allowing the development of integrated resource management plans, and the facilitating of their translation into management practice.

According to the Lamontagne Senate Committee, 18 different resource institutions in the Government of Canada share responsibility for natural resources, each acting rather independently of the other.

ANALYSIS

Level of Present Technology

While the present level of technology in integrated resource management is, beyond any doubt, inadequate, the primary factors inhibiting development of integrated resource management do not at present occur at the technical level. Maximization of public welfare¹ could be greatly enhanced on the basis of what is presently known. Available knowledge is not being fully used. Certain important technical factors are nonetheless evident: we cannot make economic evaluations of certain management benefits: we cannot quantify that "maximization of benefits" embodied in integrated resource management.

We have virtually no experience in integrated resource management. In order to determine where implementation problems lie, we should immediately attempt some integrated resource management projects, thereby making visible the problems encountered and the relative intensity of priorities.

We are almost totally dependent on U.S. experience in recreation management; few Canadian recreation management studies have been made.

¹No rigorous definition of "public welfare" is attempted. The term is used throughout in a valid philosophical sense, and not within the apparent constraints implied in its definitions and interpretations in the field of market economics.

Actual recreation management in Canada is concentrated in parks: though a major need is the management of land for recreational benefits on the bulk of those Canadian lands which lie between the federal and provincial parks.

As a nation, our policy in natural resource research and development seems to be that whenever timber management research needs are adequately and handsomely met, then it will be time enough to look at some of the so-called peripheral resource areas. The same, to some degree, is true of our universities. (This does not imply that timber management research needs are at present being adequately and handsomely met.)

These comments point out the need for research of altered priority and intensity; such needs are considered later in this report.

The immediately limiting factors are: the lack of social concern, the lack of environmental quality concern, inappropriate legislation, inappropriate organization, low professional staffing levels, and a lack of land management planning. Problems are, to a large extent, attitudes, biases and opinions, rather than technological inadequacy. Consideration of these factors by people in government administration, and by elected representatives, is needed.

Level of Social Concerns

Integrated resource management is fundamentally a social concept, as Rowe and McCormack (1968) show. Key quotations from this paper follow:

"The idea of multiple use of forest land in North America is modern and popular; it arises not so much from the traditional resource producers -- the timberman, the grazer, the hunter -- as from the general public as consumers. It appears today as a democratic idea in which the assumption is implicit that the land (particularly the large areas that are publicly owned) has social values that

take precedence over the economic interests of the individual producer, or of the single user. As such it is the concern of government responsive to public needs.

"It is an important point that in North America 'multiple use' is oriented to people, to the public as consumer; it is oriented neither to the single resource user nor to the tenant or owner as producer. In other words, the idea did not arise as a logical and economically sound proposition for the individual resource developer, but rather as an expression of what citizens believe their country can contribute to the 'good life'. The point is clarified by considering the difference in attitude to resources between the single resource producer, or user, and government expressing public demand."

Rowe and McCormack (1968) also pointed out the lack of necessary correspondence between public and private interest, as the following quotation shows:

"Private enterprises -- individual and industrial -- naturally seek to maximize profits, and this has usually been done by concentrating on the development and exploitation of one land resource. In seeking to maximize social well-being, the aims of government are not always congruous with the aims of private enterprise, although the two tend to be highly interdependent. Thus, on the consumer or public side, the pressure for multiple use of land expresses the need to draw a variety of commodities or social values from the land, a need that from the single-resource producer's viewpoint may seem naive if not economically ruinous."

It has elsewhere been suggested (Jeffrey, 1968 a) that most resource managers are strongly "technocentric" in orientation, while resource management is concerned with human benefits, or is "democentric". Because of the prevalent "technocentricity" in resource managers, who focus attention upon resources rather than upon the people who benefit from their use, a significant basic defect in management seems probable.

This seems likely to persist, given the low level of attention typically paid to social factors in the university departments training most of our resource managers. Thus management tends to become set in a mould

emphasizing maximum direct economic returns, rather than maximum human benefits.

This appraisal indicates a major inhibiting factor in the realm of social science. As a result, a need for a much larger input of social science research into land management questions is postulated.

The general question of social factors in relation to integrated resource management -- besides indicating a greatly increased research input need -- also indicates that the common goal of obtaining short-term maximization of economic returns needs to be critically re-examined in the light of long-term environmental and social needs.

There are also implications for the education of resource managers, and for their role in resource policy formulation.

Environmental Quality Considerations

Questions of interactions between integrated resource management and environmental quality are basically of a social nature. So the consideration which follows is very closely connected with the immediately preceding one.

It has recently been suggested that the quality of the environment should be universally recognized as a basic human right, each individual having the right to live in an acceptable environment in the same way as, for instance, society recognizes the right of all persons to education (Tarrant, 1966; Jeffrey, 1968 a). It is the function of government to secure and safeguard that right.

The postulated right to a given quality in the life environment is not enshrined in any of our legislation, no doubt, because environmental

quality problems are of a relatively recent genesis. Our forebears had no reason to stipulate environmental quality rights in the constitutional framework of society. At that time, few problems of environment existed, or at least were recognized.

Yet it would not seem an exaggeration to say that the right to a reasonable level of environment is at least as basic as the rights and freedoms guaranteed to people. These basic freedoms are much more effectively guaranteed, and cannot readily be abrogated, reduced, eroded or compromised. They may be specifically modified only after searching scrutiny in the full light of public concern, and only when it has been shown overwhelmingly that the modifications proposed are, beyond any doubt, in the full public interest, and for the general public good¹.

Under conditions of rapid technological change and violent environmental impairment, often with resulting side effects which go far beyond any original expectation, the freedom to live in a safe and healthy environment should stand at the same level as those basic freedoms such as freedom of religion and speech, freedom of assembly and freedom of the press taken for granted in a democratic society. These and like freedoms are entrenched in the Common Law, and appeal procedures extending up to and beyond the Supreme Court of Canada are available so that they may not be jeopardized.

¹This sentence may be an overstatement. Canada has, as yet, no entrenched constitutional bill of rights. Guarantees stem from the Common Law, overlaid by more recent confirmatory legislation. Although the supremacy of Parliament is still very much a fact, specific cases dealing with freedom of the press, religion and speech have generally confirmed the tenets of the Common Law.

The environment, by contrast, is much more vulnerable to unilateral and private decision within the market economy. Moreover, the burden of proof tends to lie, under current social philosophies, upon the public as a whole, rather than upon the initiating agency.

While the analogy between basic freedoms guaranteed in a democratic society and the lack of similar guarantees of a living environment quality may not be exact, it points out an area of legislative and constitutional concern extending to our basic social framework.

It also shows a need, as a stop-gap measure, for immediate environmental quality guidelines, upon which to judge integrated resource management practice. The necessary crudity of those guidelines, in first form, would still be much superior to the present situation.

If a quality environment is recognized as a basic human need and human right, it also indicates that this must be a federal concern.

Legal Factors

Resource legislation in Canada typically deals with individual resources rather than with the joint production of all resources from a single piece of land. Furthermore, much legislation dealing with individual resources is internally contradictory; and, where conflicts exist, it is not clear where the overriding authority lies. For example, in British Columbia, certain provisions of the Mineral Act are in direct contradiction to provisions in the Forest Act and the question of precedence is unresolved.

For another example of inadequacy in legislation, one may refer to the W.A.C. Bennett Dam¹ on the Peace River. Constructed in British Columbia, the dam impounded large volumes of water and affected other resources, not only in the impoundment area, but downstream. Construction of the W.A.C. Bennett Dam affected fishery resources, muskrat and waterfowl populations, and navigation; it resulted in the lowering of lake and river levels; its hydraulic effects were such that downstream bridge approaches were destroyed. And because of lower river levels, some municipalities were forced into additional expenditures to extend water intakes.

Many of these harmful effects took place in Alberta and not within the province where the dam was built. The Resources Transfer Agreement Act stipulated that, "The provinces shall not interfere with waters flowing through a national park."² The Peace River flows through Wood Buffalo Park in northeastern Alberta, though not through any national park in British Columbia.

By law, in some provinces, only members of specified professions may administer certain land management statutes. Such restrictions can seriously hinder integrated resource management, and can limit the promotion and development of other professionals. Such practices reflect the historical preoccupation with single resources.

¹Citations of downstream damage accruing from the W.A.C. Bennett Dam are from press reports. For a broader overview of such problems see Hanssen (1968).

²Statutes of Canada, 1930, 20 - 21 George V, Parts I - II.

For these reasons, the present structure of resource legislation in Canada seems often to be divisive, and to inhibit integrated resource management progress.

It would, therefore, appear that a historical evaluation of resource legislation, and of its impact upon resource management throughout the country, deserves consideration. Similarly an evaluation of present legislation, its impact, and its effects -- inhibitory and otherwise -- upon progress towards integrated resource management, is desirable and should be implemented.

In this connection, the Canadian Council of Resource Ministers has embarked upon a survey of legislative authorities and management practices at all levels of government in Canada.¹ It is desirable that the National Committee on Forest Land make, and keep, itself current on this study of land administration practices and legislation, and on other studies undertaken by the CCRM. (For example, during 1968, the Council produced two compendia, one dealing with water resources legislation and the other with outdoor recreation.)

Legislation designed specifically to encourage integration in resource management is needed at all levels of government in Canada. Such legislation must involve rationalization of the present legislation dealing with individual resources. This necessarily presumes that governmental policies specifically dedicated to integrated resource management will be adopted.

¹CCRM, 7th Annual General Meeting and 9th Plenary Session, October 9 - 10, 1968. Published minutes, p.11.

Land Tenure Factors

The wildlands of Canada are managed under many different forms of tenure. In British Columbia, for example, the Sloan Commission (1956) report illustrates a number of forms of tenure used within that province.

Much public forest land is placed in the hands of large industrial organizations, as limits or licences. These delegated public lands, in actual operation, could fairly accurately be described as "quasi-alienated". Industries managing them have a corporate interest in maximizing human benefit from the same land. In the definition of integrated resource management, the primary land management objective is achievement of the maximum public welfare. The question arises, therefore, of whether delegation of public land management to industrial concerns necessarily ensures attainment of this management objective.

In truth, it would appear that much quasi-alienated public land in Canada is being managed for the welfare of a referent-group consisting of corporate stock holders¹, whose interests may entirely coincide with the general interest of society. However, there is absolutely no guarantee that such a coincidence of interest does occur; nor in today's complex world is there any great probability that it will.

¹Under contemporary social theories (see, for example, Galbraith's "The New Industrial States") large private enterprises are considered to hold, as central objectives, perpetuation of their corporation, and to prefer stability to short-run profit. This postulate is recognized, so that the suggestion of lack of necessary coincidence between corporate and public interests is not based upon inadequate consideration or on Fabian models. In fact, the newer theories of corporate goals make no difference to the argument presented, insofar as logical necessity is concerned, though they may influence individual probabilities of de facto coincidence of interest.

This is becoming a more and more sensitive point, as recent public controversy shows. Whenever there is obvious lack of coincidence between private and public interest in management of delegated public land, and the resulting controversy generates sufficient public pressure for governments to take action, the mechanism used is for government to require changes in industrial land management, through application of ad hoc administrative fiat. This mechanism has obvious inadequacies, it inflicts injustice upon industrial concerns, and the public good is not adequately safeguarded.

Such difficulties are complicated by prevalent attitudes and biases on the part of those resource personnel who make the faulty fundamental assumption that the maximum economic return, generally over the short-term, is the best expression socially of responsibility to the public weal. Again, public controversy and dissatisfaction over resource management policies show such an assumption to be inherently flawed, and to exaggerate and intensify public concern.

Conciliation of corporate and public interest in the management of quasi-alienated public lands represents a large challenge. No obvious solutions are currently in sight, given the present land tenure situation. One possible mechanism deserving consideration is the institution of some office, in the various land management jurisdictions, such as an ombudsman, or commissioner, with a surveillance function to ensure that delegated public lands are managed in such a way as to safeguard the public interest.

Another major problem, lying in the area of legal and land tenure considerations, is embodied in over-dependence upon Order-in-Council, rather than upon parliamentary legislation. (The same is true of over-dependence

on ministerial decisions, in contrast to the possible alternative of constituting expert resource management tribunals to recommend solutions to vexing questions.)

Though it is not generally realized, many parks in Canada were set up by Order-in-Council, and are thereby vulnerable to modification because they lack the protection of formal legislation.¹

The Thelon Game Sanctuary in the Northwest Territories, for instance, was set up by Order-in-Council in 1934 as a means of protecting the threatened musk ox population of the Territories. Since that time, the Thelon Game Sanctuary has become world-renowned. In the minds of many wild-life and conservation persons, it is considered inviolate and inviolable. Recently, however, the Northwest Territories took over certain resource responsibilities, and the Thelon Game Sanctuary now comes under the administrative jurisdiction of the Northwest Territories. The new Mining Act of the Northwest Territories, now under consideration, can invalidate by a simple expedient the 1934 Order-in-Council which created the Thelon Game Sanctuary, and there is some question that mining claims are already extant within this previously protected sanctuary.

This example illustrates that over-dependence by governments upon Order-in-Council carries with it certain dangers to the public interest, besides avoiding the illumination provided by the debate that precedes legislative enactment.

¹See, for example, National Parks Act.

Along similar lines, where appeals against resource management decisions are allowable, too frequently these are made to the minister concerned, or directly to the cabinet, rather than to the courts or to specialized administrative tribunals. This leaves much latitude for the exercise of departmental or professional biases.

Institutional Organization within Government

Throughout government, organization is predominantly along single resource or disciplinary lines. Thus, generally speaking (though with exceptions) our forestry organizations are legally charged with the management of forests for wood, while other separate agencies have responsibility for water, recreation, wildlife, fishery, and so on.

This means that foresters working for "forest services" usually plan road networks for forest harvesting purposes alone, and lay out cutting areas solely with regard to wood realization. Other resource interests may be consulted, but joint planning is rare. Where consultation exists, it is usually of the sort which asks, "Will this hurt your resource?", rather than, "Will this improve your resource?".

The results of this inappropriate system of government organization may be inferred by posing the following questions, and they are far from exhaustive (Jeffrey, 1968 b)¹:

¹Jeffrey, W.W., 1968 b. Old forests into new: the hydrology implications. Unpub. pap. CIF Ann. Meet., St. John's, Newfoundland. Sept. 1968. Abst. For. Chron. 44(6):41.

- (1) Where are the access programs opening up new country for the benefit of all resources, and how do these compare in number with those designed solely to open up areas for wood realization?
- (2) Where are the regional plans aimed at developing areas for the optimal benefit of all resources, or, in other words, for the optimum mixture of resource products, and how do these compare in number with regional plans for the realization of wood alone?
- (3) Where are the joint planning teams to develop cutting plans for the optimal production of wood, water, wildlife, recreation and fishery?
- (4) Where are the staff specialists in forest hydrology, wildlife habitat, fish biology and recreation management attached to our forest services to ensure expertise and balance in resource management?
- (5) In research, where are the research programs to assess the relative economics of different resources produced by the same area, and to attempt to evaluate the optimum products mix, or the relative costs of alternative uses of resources?
- (6) Again, in research, where are the large, ambitious, computer-based simulation programs dealing with all resources in a given area, and attempting to arrive at an understanding and optimal exploitation of the whole resource system, as suggested by Watt in his book "Ecology and Resource Management"?
- (7) On a less ambitious level, again in our research organizations, where are the research programs studying the effects of logging upon water, upon wildlife and wildlife habitat, upon fish environment, upon grazing values, and where are the programs to assess and understand outdoor recreation?

In the answers to these questions, it appears inescapable that the present organization and terms of reference of both our land management

and our land research agencies are inadequate to the needs of today's society. They distinctly inhibit needed development of inter-disciplinary, functionally-oriented resource management teams.

Institutional organization of government may be so inappropriate that the land is totally separated from other resources, even from the timber resource. In other instances, there is progressive alienation of land within some jurisdictions.

Existing compartmentalization in government, according to individual resource interests, seems divisive, inefficient and ineffective. This compartmentalization is a reflection of the legislative compartmentalization noted earlier.

Resource integration is needed. In most jurisdictions there are some mechanisms, largely of a "committee" type, which have resulted in recent improvement, but these tend to be sporadic and temporary, functioning only as inadequate stopgaps.

Aside from these mechanisms, the biggest single advance of recent years is the creation of the Canadian Council of Resource Ministers (CCRM), which provides an inter-governmental forum for discussion at the policy level of land resource administrative problems and experience. However, these resource ministers do not control all land; ministers of agriculture and ministers of municipal affairs, who are not represented, also control land.

It appears essential that the present organization of resource management within government should be documented, and a historical analysis made showing how the present situation developed.

It is recommended therefore that the National Committee on Forest Land submit a precis, showing the relevance of institutional organization within government to integrated resource management to the CCRM, and request that the CCRM examine this problem with a view to positive action in the form of an all-embracing study.

It is strongly recommended that any action taken towards such evaluations, whether by the National Committee of Forest Land or by the CCRM, be done through a task force approach, using a study team composed of individuals with no other responsibilities. (Such task forces might, usefully, include interested laymen.) The present mechanism in the National Committee of using government and university personnel, generally already over-extended in their responsibilities, is inefficient, inadequate. And it cannot work.

It is further recommended that the National Committee request the CCRM consider this and allied problems in the CCRM conference on renewable resources, to be held in 1972.¹

Another means of possible help in curing the organizational problems involved in the implementation of integrated resource management, is the formation of what, for want of a better term, we shall call a "Renewable Resource Council of Canada". There is adequate precedent for the formation of such a council in the Economic Council of Canada and the Welfare Council of Canada, which operate at an apolitical level, and perform an educational, as well as functioning role in a clearinghouse sense.

¹CCRM, 7th Annual Meeting and 9th Plenary Session, October 9 - 10, 1968. Published minutes, p.12.

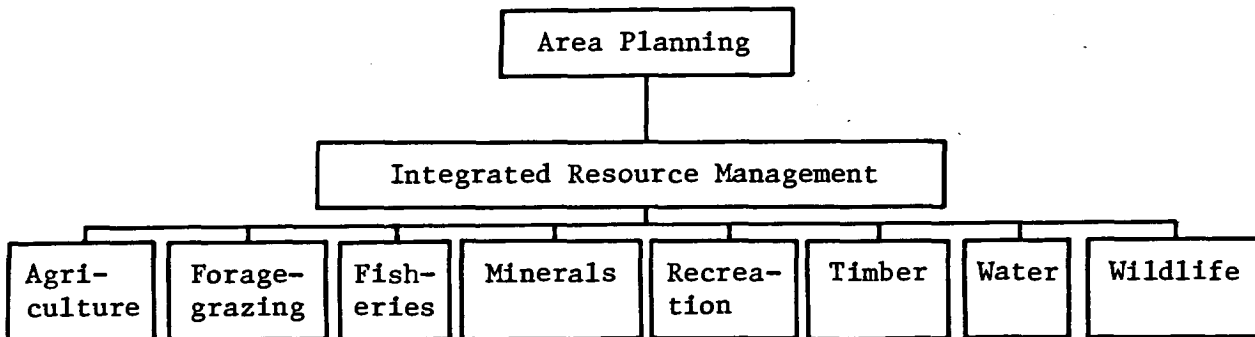
There are other precedents for more active institutions of the commission type, with strong executive powers at the policy level. Examples include the Board of Grain Commissioners, and the Board of Transport Commissioners.

TECHNICAL IMPLEMENTATION

Land Use Planning

Planning for integrated resource management in Canada has been virtually non-existent. This lack has inhibited the progress of integrated resource management, though it is understood that the Manitoba Department of Mines and Natural Resources¹ is now starting to employ composite land-use planning to improve the level and type of management.

We consider that the relationship between land use planning, integrated resource management, and specialized management for individual resource products is contained in the diagram below:



¹Mair, W.W. Unpublished talk to Canadian Soc. Wildlife and Fishery Biol., Winnipeg, Manitoba. January, 1969. See also, various reports of CLI, Manitoba Department of Mines and Natural Resources, for example, "A Guide to Land Use in the Interlake FRED Area" (1968).

By this means, strategy and policy would be defined and priorities would be set at the area planning level. Decisions on use co-ordination would be made at the integrated resource management level. At the level of individual resources, the specialized managers of individual resources, acting in concert, would apply the tactics that would attain objectives selected as defined by their superiors.

The term "area planning" has been used in preference to the better-known "regional planning" for reasons of convenience and practicality. "Regional planning" appears, under present North American convention, to be centred in urban areas, and to include the planning of capital and labour resources. "Area planning" does not necessarily have to embody these constraints or requirements.

"Area planning", therefore, allows planning to go ahead, based on existing management units, without the necessity for large-scale re-organization along "regional planning" lines. Conceptually, "area planning" is probably best regarded as a sub-component of more general "regional planning". As such, it should theoretically succeed "regional planning" in time. But this is not an essential prerequisite.

The model as depicted in the diagram would improve integrated resource management and permit a movement towards attainment of the maximum public welfare, without having to wait for the institution of large-scale regional planning. The model proposed does not necessarily imply a single departmental structure.

Implementation of most of these concepts very clearly lies within the jurisdiction of the provinces. Many institutional arrangements are possible within the model proposed. Some rationalization of management

areas would be desirable to implement the model. For instance, in British Columbia, in some cases, planning and management units may be envisaged consisting of a combination of lands presently under the jurisdiction of the B.C. Forest Service and associated contiguous lands currently administered by the B.C. Lands Service.

An immediate conclusion derived from the model is the importance of professional staff. This factor limits progress towards better integrated resource management as much as any other. Within many jurisdictions the level of professional management staffing is so low as to make any improvement, regardless of hypothetical models, entirely theoretical. The absence of significant numbers of more professionally trained people moving into management jobs is a critical factor.

The model would also mean recruitment of different types of specialists. It certainly seems likely to require less delegation of management responsibilities to industrial concerns.

Land Classification

Integrated resource management is dependent upon land-use planning, which, in turn, is closely linked to land classification. It is obvious, therefore, that a desirable precursor to a higher level of integrated resource management is a scheme of land classification which defines the ecological limitations to management. This is certainly true in a long-term sense.

Consideration has been given only to the biophysical land classification being developed under the auspices of the National Committee on Forest Land.

While this classification permits recognition of possible land-use alternatives; it is only of limited assistance in selecting the alternatives and establishing use priorities. It definitely brings to light potential conflicts as, for example, where land has a very high capability for both agriculture and timber production.

Accordingly, the proposed biophysical land classification is a promising basis for land-use planning. It shows land-use capability for agriculture, forestry, wildlife and recreation. However, there are serious problems in interpretation of land capability evaluations (both in the biophysical land classification and the Canada Land Inventory) inasmuch as no common denominator exists which allows the equation, in any objective terms, of Class I land for forestry, Class I land for agriculture, for wildlife, or for recreation. If this problem can be mitigated, it would appear possible to make a further "composite" classification of "use integration requirement".

This suggested composite classification would rate land in terms of the requirement for each land system in the integration of uses.

An example would be a land system having a high capability for timber production, and a low one for recreation, wildlife and agriculture. Such a land system would have a low use integration requirement.

A second example may be visualized as a site having a high capability for timber, recreation and wildlife. Such a land system will have a high use integration requirement.

It is recognized that such a composite classification would be subject to complications arising out of geographical location. These, however, are already somewhat taken into account in the recreation classification.

It appears that the next stage towards integrated resource management, insofar as land classification is concerned, is to carry out pilot projects of land-use planning utilizing the information developed in the Canada Land Inventory and biophysical land classification. Such pilot projects would expose difficulties and problems and develop land-use planning techniques and methodologies.

Pilot projects in land-use planning, utilizing land classification data, would also bring together persons with various disciplinary backgrounds. In this way, it is to be hoped that functionally-oriented land classification teams would be precursors to functionally-oriented land-use planning teams, which might in turn develop into integrated resource management teams of the same complexion.

With these thoughts, the Sub-Committee makes these comments and recommendations:

We commend and support the Canada Land Inventory effort of land capability mapping, and hope that these data will be fully and comprehensively utilized in area land-use planning.

We also endorse pilot schemes of land-use planning utilizing CLI data within the CLI area¹, and await a report on this topic with keen interest.

¹McCormack, R.J. Land Use Planning - Philosophy and Some Examples. Unpublished paper, Prairie Provinces Seminar on Land Use Planning. Canada Land Inventory, Department of Regional Economic Expansion. Ottawa, Ontario. November, 1968.

We support the development of land classification schemes along the lines of the biophysical land classification, recognizing that they provide an excellent step towards planning for integrated resource development.

We recommend pilot projects in area planning for integrated resource management, utilizing data derived through the biophysical land classification.

We recommend that the Sub-Committee on land classification explore the potentialities of a composite classification dealing with use integration requirements. We further anticipate that the Canada Land Inventory will work towards solution of the important problem of developing an index of integration requirement. To this end, the CLI data, and particularly the CLI geo-information system, seem extremely valuable.

RESEARCH AND EDUCATION

Research Requirements

Some research requirements have already been mentioned. Much more research into the economics of integrated resource management is needed. Such research would promote a more accurate assessment of costs and benefits, and allow comparison of values in the different resource sectors. The relative costs of alternative resource use could thus be more adequately evaluated. A greater certainty in dealing with the central concept of optimization of benefits (a keystone in the integrated resource management philosophy) would result. This is a necessary sub-component of any research using systems approaches.

Economics, however, is only one area where research is needed. It has been typical of attitudes towards resource management in the past that while, by definition, resource management is for people, most research attention, and most management attention for that matter, has been concentrated upon resources, and very little upon the people on whose behalf resources are managed. It seems logical that, in trying to manage the land resources of Canada in the public interest, we obtain some impression and some understanding of public attitudes, public concerns and public priorities on resource questions. This means significantly increased inputs into research in the disciplines of sociology and political science, in addition to those other social sciences specifically mentioned here.

Preceding comments indicate how the accomplishment of integrated resource management is inhibited and hamstrung by inappropriate or deficient legislation. And by systems of land tenure which (however appropriate they may have been in the past, and however much they have represented, at the time of their adoption, significant advances in both philosophy and technology) are now rapidly becoming less and less adapted to changing technology, and the evolving social and physical environment of the present time. This means that a considerable increase in legal research dealing with resources questions must take place.

The case of outdoor recreation provides an example of the current rapidity and scope of technological and sociological change. No agency in the Government of Canada presently has a clear legislative mandate for research in outdoor recreation. Accordingly, the effort invested in recreation research is inadequate, and no federal government agency truly accepts responsibility for such research.

Given the pressures imposed upon resources by sociological change, this is a situation which cannot long be tolerated. Recreation research into multi-purpose lands, as distinct from parks, is grossly inadequate for the need, and must soon be significantly increased.

The same comments are equally true of research into integrated resource management itself. No agency accepts responsibility for research into the actual integration of resource management. This springs from compartmentalization according to single resource interests. It is typical of most government structures, and is a factor earlier identified as most divisive and inhibitory.

As an offshoot of this, since government agencies are looking for single resource practitioners and single resource specialists, there is little incentive to the universities to devote much effort to the production of persons trained in the integration of resource management. Traditional approaches within the universities have also contributed to this situation.

Earlier it was stressed that in a time of quickening social change, coinciding with deep social concern over questions of resources and environment, important social needs and intensifying public awareness come together. A need for stronger and different, more comprehensive, approaches is thereby indicated.

Coincident with recognition of social need and of developing public awareness, certain more holistic tools have become available for research into resource management. It is probably true that the most promising and powerful of these tools is the systems modeling approach based upon large, comprehensive models, utilizing the capacities of high-speed electronic computers.

Relatively few scientists are now aware of the need for research in comprehensive integrated resource management. And even fewer combine this awareness with an understanding of the promise inherent in systems approaches, and the necessary technical skills required to utilize such tools. Accordingly, in developing an integrated resource management research capability, based upon systems modeling approaches and computer simulation, the small pool of qualified people within Canada becomes a key element in any progress made.

Scientists having, on the one hand, the understanding of research needs and, on the other, the capability of using systems and computer

simulation tools, are a major research resource. Their impact must be maximized as thrust is developed towards a higher level of technology. The recommendations which follow are based upon these assumptions and evaluations.

It is recommended that the Government of Canada establish a few (perhaps two to four) research projects based on systems modeling and computer simulation approaches, and which have a major multi-disciplinary structure and composition.

In its simplest terms, the proper people, gathered together in the proper place, must be working on a worthwhile research problem. These people must, furthermore, be adequately supported to be able to do the job of developing new composite technologies for implementing integrated resource management.

This means, in essence, research by task force. A few (initially two to four) groups have to be brought together on an ad hoc and impermanent basis through secondment, infusion of research funds and other mechanisms to form problem-based and functionally-oriented task forces. Each task force should work jointly on one carefully selected, pertinent and worthwhile problem.

Acceptance and implementation of these recommendations would result essentially in the creation of pilot research projects in integrated resource management, and would light the way towards development of the necessary composite technology.

Ideally, in these research pilot projects, there should be meaningful and balanced interaction between the university and government sectors. There should also be strong involvement of graduate students, not only to expand capabilities, but because these students are ultimately those who must solve the resource management problems of the future.

The other requirements of such pilot projects can be visualized to some extent. Essentially, teams of highly motivated and committed individuals, exempt from disciplinary rigidity, and small enough to work competently together, are required. To be effective, they require freedom and, over the short-term, guaranteed continuity of funding. They must be together physically in one location. They require funds for contracting out portions of their research to ensure that they may develop holistic models. They have large data requirements, and must be supported by a strong and adequate data-collecting program, which proceeds contemporaneously with their model-building studies. They need assurance that periodic workshops for critical analysis can be arranged, drawing upon the very limited pool of awareness and skills in this research field, both within and without Canada.

The creation of such a research program, among its other benefits, would allow the consequences of alternative goals in management to be evaluated. Resource management decisions are now being made on a "seat of the pants" basis, and exploitation of computer simulation tools will certainly provide at least a better "seat of the pants".

Use of systems modeling does not replace judgment. Rather it places judgment in a very crucial position as models are developed. The systems modeling computer simulation approach is no panacea. However, these tools are here, and no doubt here to stay. Any advance in technology carries dangers with it; this is true of systems and simulation techniques; for this reason, it is all the more important that a strong research program be developed, utilizing these tools, so that they may be expanded and refined, and their dangers and inadequacies recognized and corrected.

Requirements in Education

It is obvious that all preceding remarks have implications for professional education in the university. The Sub-Committee on Resources Education of the National Committee on Wildlife Land is examining these questions. It is recommended that the National Committee keep in very close contact with that body.

It is not our wish to anticipate the recommendations of the Sub-Committee on Resources Education. For this reason, our comments are general and philosophical in nature.

It is demonstrably true that in the past and, to a somewhat lesser extent, at the present time, resources education in Canadian universities has followed narrowly specialized and uni-disciplinary guides. This results from the prevailing structure in government, since structure dictates employment demands. But it must also be recognized that this type of education reinforces the present structure and its underlying philosophies.

There is little doubt that our uni-disciplinary resource management specialists, in their various streams, are well qualified upon emergence from Canadian schools. This is not in question. Rather, a problem exists in that education along uni-disciplinary lines carries with it elitist philosophies of both positive and negative impact. Certainly, it carries with it the danger that, through restrictive and specialist education, the graduates produced may be too narrow in viewpoint and too centralized in interest to be truly effective in the solution of the more complex problems. Problems whose intensity we now begin to experience.

Biases and attitudes, directly harmful to a better integration of resource science, may be engendered. The graduates' training may not

fully meet the needs of society and they may be ill-prepared for integrated resource management.

In view of these dangers, there has been advocacy of different undergraduate-level programs leading to the production of individuals trained at the Bachelor's level for the achievement of integrated resource management. Such an alternative carries other and different dangers. Such programs run a very severe hazard of being both too broad and too shallow. They may, in short, produce a type in whom the general concern of the dilettante is accompanied by his general ineffectiveness.

Added to recognition of these different sets of hazards, in the two philosophically divergent concepts of resources education, is an awareness that the jobs of the future fall into three major categories:

(a) single resource managers, (b) researchers and (c) integrated resource managers.

The present and continuing need for single resource managers is indisputable. This need necessarily will dictate a major stream of the university's accomplishment in resources education. Therefore, it could not be sensibly suggested that training of single resource managers be discontinued. It is probably important, however, that in their undergraduate years they are imbued with some understanding, awareness and sympathy for those resources related to the one which is the core of their specialization.

The characteristics of superior graduates in any field of resources are believed to be, first, a good base in fundamental science, second, the acquisition of certain minimal tools of their profession, and last, an analytical and flexible ability to solve previously unencountered problems. Within the streams of disciplinary specialization in resource

management, it is believed that curricula centred around these assumptions and goals are most likely to be successful.

According to the model previously presented, integrated resource managers will be key decision makers. They are therefore leaders. And as in other spheres of human activity, they are never likely to be numerous. The resource manager, therefore, is thought of as an integrator, a leader of a team of single resource specialists. We do not believe that such people can be accurately pre-selected during their undergraduate years. It is probably more accurate to assume that these leaders will become visible on the job as they accumulate experience, perceptiveness and insight.

The researcher in integrated resource management, it is believed, can be recruited from any field or discipline of the general resources complex. His education at the graduate level should, it is thought, consist of an inter-resource research capability grafted on to a basic, relatively rigorous Bachelor's training in science or one of the resources disciplines.

At both the graduate and undergraduate levels of resources education, it is likely that stress upon the common concepts underlying all areas of resource management, i.e., "principles" courses of various sorts, would do much towards the development of better qualified people.

Finally, the need for continuing education and "retraining" programs in all areas of resource science cannot be overstressed. The same is true of the need for interaction between universities and government.

CONCLUSION

This report has stressed the pertinence of social factors to integrated resource management, because of a belief that these are the considerations which now require priority attention. Technical, industrial and market factors are not equally stressed, because they are believed to receive better recognition already. The importance of this latter class of factors is in no way denied.

We recommend that the content and recommendations of this report be widely disseminated, in particular to CCRM, to provincial and federal officials, and to the National Committee on Wildlife Land. We further recommend that the Chairman, National Committee on Forest Land, seek to have a condensed version published in the Forestry Chronicle, so as to bring the report to the attention of the forestry profession at large, and to take such other measures as he deems appropriate for dissemination of its findings.

We request that the National Committee on Forest Land consider, with a view to acceptance, the content and recommendations of our report.

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