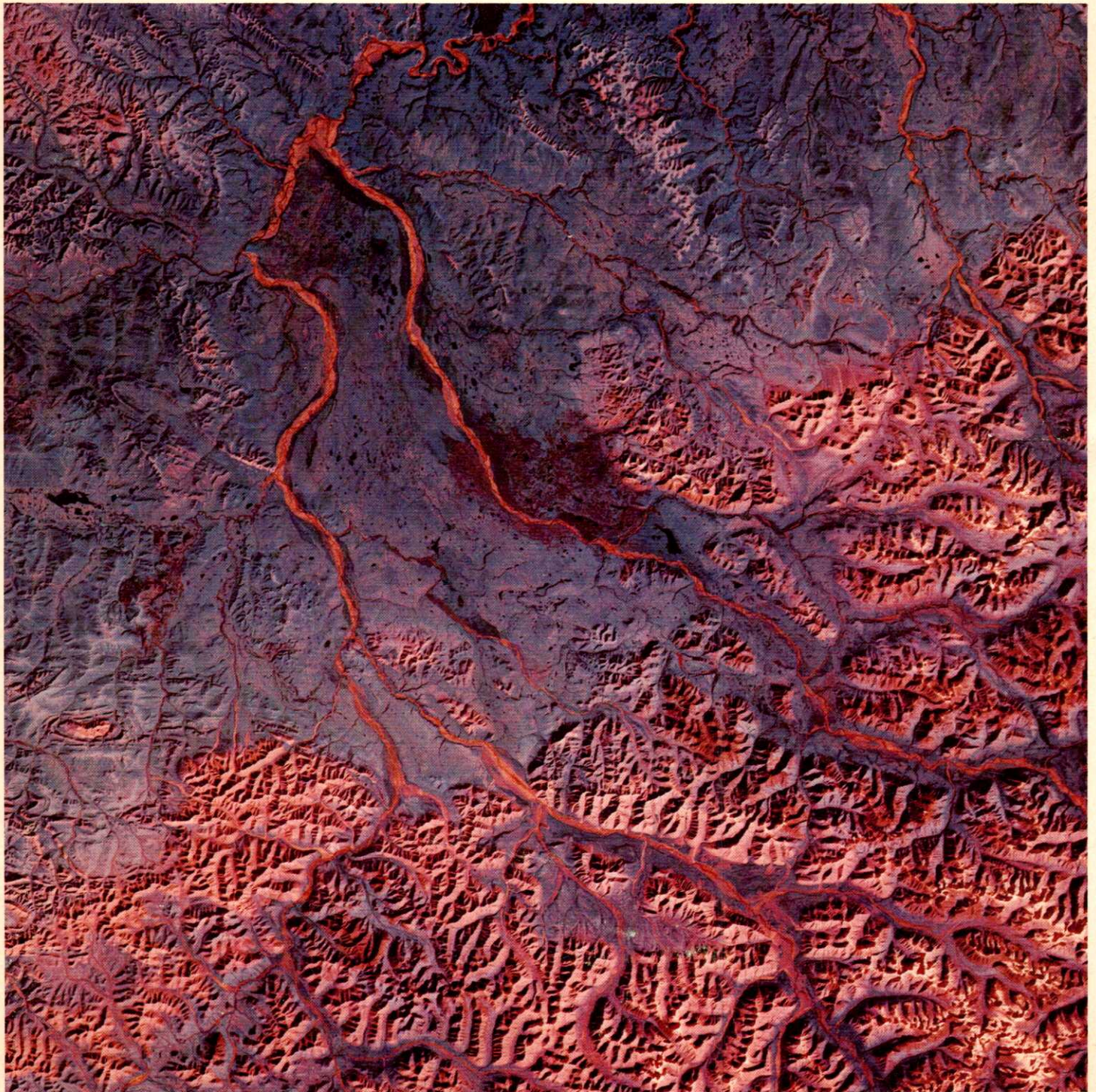


**ECOLOGICAL (BIOPHYSICAL)
LAND CLASSIFICATION
IN CANADA**

**CLASSIFICATION ÉCOLOGIQUE
(BIOPHYSIQUE) DU TERRITOIRE
AU CANADA**



AN EVALUATION OF REMOTE SENSING TECHNIQUES FOR ECOLOGICAL (BIOPHYSICAL) LAND CLASSIFICATION IN NORTHERN CANADA

J. Thie
Lands Directorate
Environment Canada
Ottawa, Ontario

ABSTRACT

The use of LANDSAT satellite and airborne remote sensing imagery are evaluated in a sub-arctic and northern boreal environment near Churchill, Manitoba. Accuracy and cost-effectiveness of a number of interpretation methods are compared, including visual and automated (supervised and unsupervised) techniques of LANDSAT data and air photo interpretation. Classification results of the different techniques are compared by using the overlay capabilities of the Canada Geographic Information Computer System. Conventional interpretation of aerial photographs enabled classification of about 43 different land types, and proved the best and most practical method for comprehensive biophysical mapping. Satellite-based methods allowed the mapping of about 10 groups of land types, often so broad that their practical value for resource management is limited. At present, visual satellite interpretative methods are more cost-effective than automated approaches for ecological land classification in most parts of Canada.

INTRODUCTION

Environmentally sound resource management requires basic biological-physiographical and socioeconomic data that allow an integrated or multidisciplinary approach. In the southern developed part of Canada, the Canada Land Inventory Program has provided a multidisciplinary land capability mapping. One-third of our land area is covered with this nationally consistent information base. For about 3.5 million km² of land in the north, there is a serious lack of such base line data (Romaine, 1974).

The National Committee on Forest Land, working under the auspices of the Canada Land

RÉSUMÉ

L'emploi de satellites de LANDSAT et d'images obtenues par télédétection aérienne est évalué dans un milieu subarctique et boréal près de Churchill, au Manitoba. L'exactitude et le rapport coût-efficacité d'un certain nombre de méthodes d'interprétation, y compris les techniques visuelles et automatisées (avec ou sans surveillance) d'interprétation des données LANDSAT et de photo-interprétation, sont comparées. Les résultats de la classification des diverses techniques sont comparés par l'exploitation des possibilités de recouvrement de l'ordinateur du système d'information géographique du Canada. L'interprétation classique des photographies aériennes a permis de classer environ 43 types de terrains, et s'est avérée la meilleure et la plus pratique des méthodes de cartographie biophysique. Les méthodes utilisant les satellites ont permis de dresser des cartes d'environ 10 groupes de types de terrains, souvent si généraux que leur applicabilité à des fins de gestion des ressources est limitée. A l'heure actuelle, les méthodes visuelles d'interprétation des images prises par satellite sont plus efficaces, relativement au coût, que les méthodes automatisées en ce qui concerne la classification écologique des terres dans la plupart des régions du Canada.

Inventory Program, recognized this gap in environmental data and through its sub-committee, started the development of a classification system to provide this biological-physiographical data base for 'wildlands'. The biophysical land classification system evolved. The further development of this system is now supported by the Canada Committee on Ecological (Bio-physical) Land Classification.

The aim of the classification system is to differentiate and classify, at a small scale, ecologically significant segments of the land surface (Lacate *et al.*, 1969). It was recognized that this system should be ecolog-