

E72-10118

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October 3, 1972

MEMORANDUM

TO: NASA Scientific and Technical Information Center

ATTENTION: ERTS Program  
P.O. Box 33  
College Park, Maryland 20740

FROM: Laboratory for Applications of Remote Sensing (LARS),  
Purdue University

SUBJECT: Preliminary Results on Automatic Identification  
of Forest and Agricultural Cover Types Utilizing  
ERTS-1 Data Over the Wabash River Basin.

A summary of results is enclosed for preliminary classification of a portion of ERTS-1 Frame No. E 1016-16050. These data arrived at Purdue University on September 22nd and our first analysis was completed on September 23rd. Revision and second classification were completed by September 26th for this data. This research was done under the study entitled "A Study of the Utilization of ERTS-A Data from the Wabash River Basin", Proposal No. 049; GSFC Identification No. UN127; Principal Investigator, D.A. Landgrebe.

R.M. Hoffer

RMH:sjt

cc: D.A. Landgrebe

(E72-10118) PRELIMINARY RESULTS ON  
AUTOMATIC IDENTIFICATION OF FOREST AND  
AGRICULTURAL COVER TYPES UTILIZING ERTS-1  
DATA OVER THE WABASH R.M. Hoffer, et al  
(Purdue Univ.) 3 Oct. 1972 2 p CSCL 08F G3/13 00118  
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Unclas

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## 2A. Land Use Analysis

"Preliminary Results on Automatic Identification of Forest and Agricultural Cover Types Utilizing ERTS-1 Data Over the Wabash River Basin"

ERTS Frame No.: E-1016-16050, obtained on 8 August 1972  
Run Number: 72008600 Classification Serial Number: 092633301

### Introduction

ERTS-1 Frame No. E-1016-16050 CCT data arrived at Purdue University on September 22. Although 60% or more of the frame was cloud covered, an area of approximately 300 square miles which was cloud-free was selected for analysis. This area is located approximately 20 miles west of Evansville, Indiana and includes the junction of the Wabash and Ohio Rivers.

### Procedure

After the data from the designated study area were reformatted, a preliminary classification was produced, using the clustering algorithm. This automatic classification result was completed on September 23, within 18 hours after the data tapes had arrived. Study of these results indicated some misclassifications, particularly those between water and cloud shadows present in the data. A second iteration was then carried out, utilizing 15 different spectral classes plus a hand-selected class for clouds and another for cloud shadow areas. This revision and classification work was completed on September 26.

### Results

The second classification shows well defined field boundaries and an accurate delineation of the forested areas. The classification includes the following categories, each of which are represented by one or more spectral classes:

- row crops (corn or soybeans)
- forest and woodland areas
- diverted acres, pastureland, or nonproductive grassland areas
- water (primarily Wabash and Ohio Rivers)
- clouds
- cloud shadows

A number of agricultural fields appeared bright blue on the color infrared composite prepared using Channels 4, 5, and 7. The cause of this spectral response has not been determined, although it is thought that it is related to very high rainfall just prior to the collection of this ERTS data. The results of this classification are significant in that they show the potential for accurate identification and delineation of forested and agricultural areas, using automatic data handling techniques. Additionally, these results indicate the potential for rapid analysis of data collected over relatively large geographical areas.