

General Disclaimer

One or more of the Following Statements may affect this Document

- This document has been reproduced from the best copy furnished by the organizational source. It is being released in the interest of making available as much information as possible.
- This document may contain data, which exceeds the sheet parameters. It was furnished in this condition by the organizational source and is the best copy available.
- This document may contain tone-on-tone or color graphs, charts and/or pictures, which have been reproduced in black and white.
- This document is paginated as submitted by the original source.
- Portions of this document are not fully legible due to the historical nature of some of the material. However, it is the best reproduction available from the original submission.

STIF

II
LETS

Kentucky Dept. of Natural Resources
& Environmental Protection

E7.6-10303
CR-146808

07
"Made available under NASA sponsorship
in the interest of early and wide dis-
semination of Earth Resources Survey
Program information and without liability
for any use made thereof."

SECOND QUARTERLY PROGRESS REPORT

NASA Investigation 22640
May 21, 1975 - August 21, 1975

ENVIRONMENTAL EFFECTS OF
STRIP MINING

A. PROBLEMS

As in the 1st quarter, the major problem encountered during this
report period was acquisition of satellite data.

In this period, LANDSAT-2 has acquired imagery with acceptable
IQC on two (2) occasions, June 8, 1975 and July 14, 1975. The July 14
imagery was not received as of August 21. Thus, to date, acceptable
imagery was acquired on only three (3) occasions from the time the
satellite was launched in January, and those dates were not distributed
throughout the period, resulting in a gap of almost 16 weeks between
successive coverage of the test area in February and June. An exami-
nation of LANDSAT-1 data suggests that the gap might have been shortened
to perhaps eight (8) weeks by use of imagery from both satellites.

Computer Compatible Tapes of the February 20 LANDSAT-2 imagery were
received early in August and transferred to the Environmental Research
Institute of Michigan in Ann Arbor, Michigan for data analysis. A great
deal of trouble was experienced in trying to read the tapes into the
ERIM computer. The tapes were shipped to NSTL in Bay St. Louis, Miss-
issippi and similar problems were encountered. The problem was
diagnosed as spurious magnetization on the tapes. The EROS office at
NSTL arranged to return the defective tapes to the EROS Data Center in
Sioux Falls, South Dakota and to have new tapes prepared.

The Project Coordinator, Mr. William S. Kelly, resigned his position
with the Commonwealth of Kentucky on August 15, 1975. While every effort
was made to expedite the transfer of functions to the new coordinator,
Mr. Birney R. Fish, there have been delays and other problems occasioned
by this change in project personnel.

B. ACCOMPLISHMENTS

(1) June 1975:

On the basis of enlargements of LANDSAT-2 imagery (approximate scale
1:170,000) and of high altitude photography received during this report
period, ground truth studies were begun in the test area. Vegetation ground
truth checks were made in June for 3 mines and water quality checks were
made for 2 mines near Madischnville, Kentucky.

Birney Fish

(E76-10303) [ENVIRONMENTAL EFFECTS OF STRIP
MINING] Quarterly Progress Report, 21 May -
21 Aug. 1975 (Kentucky Dept. of Natural
Resources and) 3 p HC \$3.50
CSCI 081

G3/43
Unclas
00303

N76-22622

22640
RECEIVED

NOV 10 1975

SIS/902.6

SECOND QUARTERLY PROGRESS REPORT
NASA Investigation 22640
Page Two

Discussions were held by the Environmental Research Institute of Michigan with Mr. Harvey Wagner, University of Michigan School of Natural Resources, pertaining to a computer processing system he is developing. This program, the LANDSAT Interactive Gray Map and Level Slice (LIGMALS) System, is expected to permit the processing of MSS data at costs perhaps a factor of 2 to 4 times less than those of more complex processors. This would be of considerable important in a routine strip mine surveillance program requiring repetitive monitoring.

The original concept of this study included the mathematical modelling of the cost effectiveness of detecting violations of reclamation regulations by satellite imagery. The early, single violation model has been extended to include the multiple violation case. This work offers the promise that some violations, themselves undetectable, can be "detected by proxy" if they are positively correlated with violations which are easily detected.

(2) July 1975:

Ground truthing was continued in the test area by observation of spoil grading and of vegetative cover. During the week of July 21 - 25, Mr. Claude Downing, Assistant Area Supervisor for the Western Kentucky coal field, and Mr. Scott Ingram, a representative of Ford, Bacon, and Davis, collected and analyzed water specimens from 25 lakes and impoundments in the test area; at least two (2) samples were obtained from each source. Iron content ranged from less than 1 to approximately 7 ppm and the pH of the water samples ranged from 4 to 9.

Based on data for the years 1971 through 1974 supplied by the Reclamation Division, MATHEMATICA, Inc., did a preliminary analysis of the current strip mine inspection process. One of the findings is that there is a highly significant (0.01 level) seasonality in the occurrence and reporting of violations. Months of greatest violation rates are January through May, with the maximum in April. A lower peak is reached in the period August through October. Minimum violation rates were recorded in November and December and a weaker minimum was observed for July. These findings are pertinent to the feasibility of applying LANDSAT imagery in a routine surveillance program. Further studies are planned to assess the interaction of seasonality of cloud cover, affecting LANDSAT image availability, and that of specific categories of violations.

(3) August 1975:

Results of the ground truth studies were summarized by the preparation of a map of the study area. Black and white, low-altitude aerial photographs, U. S. Geological Survey topographic maps, and field surveys were used to map surface mined lands, highwalls, haulroads, coal prepara-

SECOND QUARTERLY PROGRESS REPORT
NASA Investigation 22640
Page Three

tion plants, gob piles, slurry ponds, lakes and other water impoundments on acetate overlays at a scale of 1:24,000.

C. SIGNIFICANT RESULTS

None to report.

D. PUBLICATIONS

None

E. RECOMMENDATIONS

None

F. FUNDS EXPENDED TO SEPTEMBER 21, 1975

\$1,102.00

G. DATA USE TO AUGUST 21, 1975

	<u>Value of Data Allowed</u>	<u>Value of Data Ordered</u>	<u>Value of Data Received</u>
LANDSAT Imagery	400	237	161
Computer Compatible Tapes	1000	200	200
Aircraft Imagery	2538	665	665

H. AIRCRAFT DATA

High altitude aircraft imagery covering the test area was received in this report period. Both color and B&W IR photography were included and proved to be extremely valuable in determining ground truth (retrospectively) for February 20, the date of the LANDSAT-2 imagery and of the aircraft overflight.