Contract NAS 5-21762

Bi-Monthly Progress Report

Reporting Period

1 January 1973 thru 1 March 1973

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Prepared For: NASA/Goddard Space Flight Center

Bi-Monthly Progress Report
Period 1 January 1973 - 1 March 1973

a. TITLE: Ecological Effects of Strip Mining in Ohio, GSFC PR 569, SR 309, Mr. Phillip Chase

b. Objectives:

1. To map the acreage stripped or otherwise disturbed by coal mining operations in southern and eastern Ohio.

2. To detect, identify, and map the secondary effects of coal mining operation (strip) on the environment. These include erosion, vegetative stress, and stress, and sedimentation in rivers and lakes. The effects of water drainage and mine acid seepage are also of interest.

3. To study the after-effects of mining operations and compare recovery time and effectiveness with which mined areas are restored to usefulness.

4. To investigate the feasibility to transfer of knowledge gained by this study of Ohio to other strip mining regions of the U. S.

c. The problems impeding the progress of the investigation are a lack of U. S. Standard Catalogs and slow shipment of CCT's. The catalogs are very important.

d. Accomplishments:

1. A Type II report on interpretation of ERTS-1 imagery for geological features in Ohio has been completed. Although it will be submitted under separate cover, it should be considered as an attachment to this bi-monthly. A narrative history of strip mining in Ohio is completed in rough draft form and will be submitted at a later date.

2. The CCT's have been processed to obtain the following outputs (one strip mine east of Coshocton, Ohio).

(a) Digital printout showing density levels in bands 5 and 7.

(b) Decision imagery of earth and standing water.

(c) Cal comp plots of earth and standing water.

3. Software is now available that corrects the cal comp plots for earth rotation, skew due to earth rotation and squares up the picture elements. At this time the digital printout (and CRT display) and decision imagery are not corrected for the same geometric errors as the Cal Comp plot. Such corrections are possible to make and will be in the near future.

4. A presentation was prepared and presented at the symposium. A paper was prepared for the proceedings.

5. The Data Analysis Plan in the proposal has been validated and has been approved by NASA.

6. Activities Planned for the Next Reporting Period:

   (a) Prepare CCT imagery in Bands 4, 5, 6, 7 of the mined area of Belmont County for scene 1084-15415

   (b) Prepare decision imagery of bare earth and water of Belmont County and part of Coshocton County. This will be a disruption map.

   (c) Obtain MSS data from aircraft in conjunction with an ERTS-1 overflight. The test site will be the stripped area of Belmont County and two mines in Coshocton County. Gather ground truth at the same time.

   (d) Classify for water types, earth types and percent of reclamation based upon processed CCT's.

   (e) Submit a Type II narrative history of strip mining in Ohio.

e. Significant results for this and previous reporting periods have been presented in the symposium paper. The results are briefly summarized here.

1. ERTS-1 imagery has identified when reclamation has proved successful, when little lateral extension has occured in the strip mine, when water has filled an impoundment (4 - 5 acres), and detected narrow contour mines.

2. It has been proven that the CCT contains more information than the imagery received from NASA. A stream is visible in the Band 7 digital printout that is not visible in the imagery. Also narrow bodies of water between the high wall and spoils bank and small impoundments (2-3 acres) are observed in the digital printout and not in the imagery.

3. Disruption maps (water and bare earth within the mined area) can be made by statistically processing the CCT (Decision Imagery) or mapping the digital printout with a Bendix Datagrid^{R} Digitizer.

4. Reclamation maps will be produced in the near future through decision imagery.

5. There seems little doubt that the mapping of present stripping and the monitoring of the strip-mine cycle for changes are practical. Disruption mapping is now an operational capability.

f. No release of information or requests for permission to release information have been made during the reporting period.

h. There have been no changes in the standing order form.

i. There are no ERTS Descriptor Forms for the period.

j. No retrospective Data Forms are attached covering the reporting time period.

k. Work to date conforms to schedule (Item C in paragraph 3.1 of Spec 5-250-P-IC).