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PROGRESS REPORT

for

OHIO SKYLAB EREP INVESTIGATION

NASA LeRC Contract NAS3-19521

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Principal Investigator: Mr. Paul Baldridge

Reporting Period: June, 1975

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OVERALL PROGRAM STATUS

Initial program efforts included: (1) developing the detailed milestone plan, (2) assembling the data bases required to support each task, (3) coordinating with all participating user agencies and personnel (State, county, and local), and (4) refining data analysis plans and final product formats for each of the 3 task areas. During this reporting period, efforts focused on data analysis and continued interaction with participating user agencies and personnel. Some effort continued to be expended on acquiring additional data base materials. Overall program status is close to that proposed in the milestone plan contained in the last progress report. The surface mining task remains the only exception.

A brief summary of major activities accomplished and in progress for each of the three technical tasks follows. Also, potential problem areas that could perturb critical task scheduling are identified. This is followed by a section noting significant results and a final section containing a summary outlook with appropriate recommendations.

TASK PROGRESS SUMMARIES

Task 1. Technical and Economic Comparison of Skylab and Aircraft Surface Mining and Reclamation Data.

General Status and Major Accomplishments

Progress on this task has been delayed somewhat because of the need to designate watershed study site areas and parameters of priority interest to ongoing Ohio Department of Natural Resources (ODNR) activities in the coal surface mining area. This problem was resolved in a June meeting among ODNR, DECD, and Battelle personnel. The prime study site will be Watershed #46 in Southeastern Coshocton County because of the availability of high quality Skylab photography and the existence of an operational program in that area. The other watershed choice which required evaluation was between Watersheds #64 and #10. Watershed #64 was selected since ODNR's Mined Land Reclamation Program has recently completed a pilot study in a portion (Subwatershed) of this watershed designed to test the Department's ability to implement an overall reclamation process for restoring orphaned (unreclaimed) lands throughout Ohio. This study would thus serve as a good test of the utility of Skylab data. However, subsequent analysis of available Skylab data has been disappointing in that most of this area is heavily cloud covered. Accordingly, only very selective correlations will be possible. Watershed #10 was rejected since planning activities have only recently begun and Skylab data for that area were only slightly improved over that available for Watershed #64.

Planned Activities

This task will receive major analytical efforts during July and hopefully more technical-user personnel exchanges can be arranged.

Potential Problem Areas

Delays due to watershed study site selection complications and need for expanded technical-user personnel exchanges have already been noted.

Task 2. Assessment of Timber Resources in Northeast Ohio Using Skylab Data.

General Status and Major Accomplishments

Activities on this task have progressed essentially as scheduled. During this reporting period the following task activities were achieved:

- S190B High Resolution Color Photography of September 15, 1973, was used to map forest stands in Trumbull and Mahoning Counties at a scale of 1:63,360 (1 inch = 1 mile). Forested areas 10 acres or larger were included on the base map. Smaller forested areas could also be identified on the Skylab photography but were determined to be too small to be included on the base map at the working scale of 1:63,360.
- Sixteen forested areas varying in size and located throughout the three counties have been selected as study sites. The test areas were selected by the Crossroads RC&D and ODNR staff on the basis of stand composition and maturity. Selected study sites are being analyzed at a scale of 1:24,000 (U. S. Geological Survey quadrangle map scale.) Analytical efforts to date include inventorying the forested areas, and delineating areas covered by brushland. Initial observations have revealed distinct and different spectral characteristics among the various forest stands which may be indicative of forest composition and maturity in each of the three counties. However, correlations and accuracies between such observed characteristics and actual ground conditions have not been completed to date.
- Laboratory verification of the above products has begun using 95 infrared color aerial photographs acquired over ten sample plots in Mahoning and Trumbull Counties which were obtained during a May flight.

Planned Activities

Task activities planned to be initiated or continued during July include the following:

- Completion of a measurement matrix of forestry features observable
- Completion of inventories and thematic maps for the study sites and counties
- Undertake cost analysis activities
- Continued interaction with user personnel
- Outline and draft portion of final report.

Problem Areas

Two problem areas have been encountered in this reporting period which hindered the analysis of the data. However, both problems have successfully been resolved.

Some difficulty was experienced with areas containing bodies of water which displayed spectral characteristics similar to those of forested areas. This problem was readily overcome, because the base map already continued delineations of a major reservoir, and smaller water bodies were recognizable by analyzing S190A color infrared photography.

A second problem encountered was caused by an apparent vignetting effect observed in S190B and S190A imagery. This caused areas in the center of the photo to appear lighter and areas near the edges to appear darker. Although forested areas were readily delineated by human interpreters on the basis of the spectral and spatial characteristics typical of such areas, machine processing of such areas proved quite difficult. In the area covered by Trumbull, Mahoning and Columbiania Counties, densities for similar forested stands varied by 0.24 D. This problem was minimized by analyzing the three county areas in strips running parallel from East to West.

No other major potential problems can be identified at this time which may hinder the completion of the task objectives.

Task 3. Utilization and Assessment of Skylab and Aircraft Data Relating to the Encroachment on Prime Agricultural Lands by Urban Growth in Central Ohio.

General Status and Major Accomplishments

During this June reporting period the following specific activities were completed which relate to the application of Skylab and aircraft data to both the encroachment of urban growth upon agricultural lands and the assessment of agricultural land for tax assessment purposes.

- Under recent Ohio law, agricultural lands near urban built-up areas may be assessed for taxing purposes as agricultural land rather than the potential value of land for urban related uses. The intended purpose of the law is to provide farmers with a mechanism to withstand developmental pressures and to keep agricultural lands on the urban periphery in active production until development occurs. In order to become more aware of the procedures relating to the implementation of the new Ohio tax law, discussions have taken place between Battelle staff and personnel from many governmental agencies which administer or provide service related to the law. In addition to the meetings held last reporting period with representatives of the City of Columbus, Mid-Ohio Regional Planning Commission and the State of Ohio, discussions were held in June with personnel from the Franklin County Auditor, Department of Real Estate Appraisal; U. S. Department of Agriculture, Soil Conservation Service (SCS), Franklin County Soil and Water Conservation District; and, the Franklin County Agricultural Stabilization and Conversation Service (ASCS). The county auditor is the administrative agency which disseminates and evaluates applications for designating land as agricultural land

for taxing purposes. Over 500 such applications have been filed with the Franklin County Auditor, but remain unprocessed at this time. The SCS provides soil maps of the farms requesting designation as farmland for taxing purposes and the ASCS provides an aerial photograph of the farms which must accompany each application.

- Results from the above discussions have included identification of applications for using remotely sensed earth resources survey data and have provided data for cost/benefit considerations.
- Additional data base materials, especially soil maps of the study area have been acquired and reviewed. Such maps are especially important as tax rates of designated agricultural lands are based on soil type (soil management group) and soil capability class.
- Work has commenced on the analysis of urban encroachment on agricultural land in the Mid-Ohio Study area using Skylab and aircraft data. A photomosaic of Franklin County has been completed from 1972 aerial photographic index sheets and a similar photomosaic is almost completed using 1962 index sheets. Selected Skylab S190A Color and Color IR frames have been selected for use in delineating the urban/rural interface in the study area.

Planned Activities

Major activities to be initiated and/or continued in the July reporting period include:

- Acquisition of additional data base materials as needed.
- Completion of the analysis of urban encroachment on agricultural land in the study area.

- Cost analysis activities.
- User agency interaction and assessment activities as time permits.
- Outline and draft portion of final report.

Potential Problem Areas

No major potential problem areas can be identified at this time which may hinder the achievement of scientific goals and completion of task objectives.

SIGNIFICANT RESULTS

None.

SUMMARY OUTLOOK AND RECOMMENDATIONS

Successful completion of all proposed activities and completion of the draft report next month will require continued and full cooperation of all participants. With the exception of the Surface Mining Task, which started slowly, all planned tasking activities have generally progressed as scheduled. Recommendations will be included in final report and therefore have not been included in this progress report.