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EREP BIMONTHLY PROGRESS REPORT - NUMBER 13

Period: July 16, 1974 - September 15, 1974 **E7.4-10769**

CR-140122

INVENTORY OF FOREST AND RANGELAND RESOURCES, INCLUDING FOREST STRESS

Registration No. 418

Contract No. T-4106B

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Report Written: September 20, 1974

INVENTORY OF FOREST AND RANGELAND RESOURCES, INCLUDING FOREST STRESS

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A. Overall Status

1. Manitou, Colorado - range inventory site (161313).

The technical review by Mr. Forbes and Mr. Greenberger on August 29 and 30 in Berkeley, California in connection with progress plans to complete EPN:418 was gratifying. The decision was made to analyze only the SL-2 S190A and SL-3 S190A and S190B products for test site 161313 under the current contract. This was due to the uncertainty regarding when the SL-3 S192 rectified tapes would be available, the time constraint of February 1975 to have the major portion of our work completed, and the loss of proficient computer programmers to handle the data within this same time constraint. We would like to consider a Skylab carry on project to analyze the S192 data.

All other expected data products from SL-2 and SL-3 have been received except the enlargements of S190A and S190B photographs. It was acknowledged by telephone conversation to PIMO on September 3 that the products have not yet been processed but that order has been submitted.

2. Augusta, Georgia - forest inventory site (177512).

We received our first Skylab photographic data on August 29 and are now in the process of making preliminary evaluations. Only the negative films were received for SL-3 S190A camera positions 1, 2, 5, and 6 (pass 36). Because of this we are unable to work with the four-band image combiners or make color film composites for image analysis. Only S190B HR color has been received for SL-4 pass 54. We are presently working with this data to develop details of our data analysis.

Following a meeting with Clayton Forbes and Stewart Greenberger on August 29, we made a reorder of all required data products required to complete our analysis. At that time we also submitted a supplemental cost estimate to extend our Skylab experiment to June 30, 1975.

### 3. Black Hills, South Dakota - forest stress site (191312).

Interpretation of the 1:15,840-scale color resource photography of the Bear Lodge Mountains was 90 percent complete at the end of the reporting period. The preparation of a master cover-type map for sub block 4 (located in the Bear Lodge Mountains) was begun. This map and the calculated acreages of cover type within sub block 4 will be used as ground truth for the interpretation of SL-2 and SL-3, S190B imagery. It is possible that the same maps will be used for the interpretation of SL-2 S192 scanner data, if that imagery extends far enough south to completely cover sub block 4.

The following intermediate image products required for interpretation were created by the Remote Sensing Unit during the reporting period:

- a. SL-2 S190A multiband frame 113 was combined in our I<sup>2</sup>S viewer to create a color negative product of a false-color simulation. The resulting negative will be used to make 8- X 10-inch color transparencies of sub blocks 1, 2, and 4, scaled to 1:62,500.
- b. The multiband 70 mm images of frames 019 and 036 from RB-57 Mission 211 were combined to create color negatives of a false-color simulation. The negatives will be used to make 8- X 10-inch color transparencies of sub blocks 1 and 2, scaled to 1:62,500.
- c. The 70 mm multiband images of frame 015 from RB-57 Mission 260 were combined to create color negatives of a false-color simulation. The negative will be used to make an 8- X 10-inch color transparency of sub block 2, scaled to 1:62,500.

#### B. Recommendations Concerning Decisions Required to Ensure Attainment of Experiment's Scientific Objectives.

##### 1. Manitou, Colorado - range inventory site (161313).

We request a change in the original plan of work that will delete analysis of S191 and S192 data due to reasons previously explained. We suggest that a Skylab carry on project be considered to work with this data when it is received.

##### 2. Augusta, Georgia - forest inventory site (177512).

SL-3 S190A photographic products--transparencies of the black-and-white bands for pass 36 have not been received. These transparencies are needed to combine in color enhancements for our forest classification analysis. This was brought to the attention of Clayton Forbes

on August 29 during a data requirements meeting in Berkeley. It was subsequently documented on our correspondence to Forbes on September 4. All other required products that have not been delivered were listed in the table accompanying our letter of the 4th.

A letter and statement of supplemental costs involved with extending our contract to June 30, 1975, addressed to the attention of Phil R. Kimbrough, was presented to Mr. Forbes on August 29 to deliver personally. These funds are essential to pay key personnel that were employed in temporary positions early in the contract period and to cover the costs of conducting additional ground truth in the Augusta site.

3. Black Hills, South Dakota - forest stress site (191312).

Early delivery of the following S190A black-and-white 70 mm transparencies would facilitate the continuing analysis of SL-3 and SL-4 imagery:

a. SL-3 pass 39, 256:19:36:22.6505, frame 37-212, 38-212, 41-212, and 42-212.

b. SL-4 pass 85, 383:20:38:33.3521, frame 67-146, 68-146, 71-146, and 72-146.

Multispectral scanner (S192) conical scan CCT's were received for SL-2, 160:15:05:31 to 160:15:05:44. The tape product received (51-2) requires a conical scan drive for processing and program modification to eliminate geometric distortions. Our experience, and that of the University of Kansas (with whom we have a subcontract for MSS processing), has been with scanline-straightened data (51-3), which is the product we originally requested. Therefore, we must learn to process the conical scan data, as will Kansas--a choice we have selected rather than waiting indefinitely for scanline-straightened tapes. To implement this choice we will modify our existing subcontract with the University of Kansas, increasing the original cost by \$626.00, to pay for part of the expense of developing the new computer analysis program.

With the transfer of one of our Skylab coinvestigators (F. P. Weber) to the Special Mapping and Applications Center in Reston, Virginia, we are faced with the critical problem of an insufficient number of EREP documents which are needed for completing our Skylab contract. Some documents we now have will be needed by Weber in Reston on a day-to-day basis, as well as here in Berkeley. We therefore request a duplicate set of the following documents be issued to Weber as soon as possible:

1. PHO-TR523 Earth Resources Production Processing Requirements for Aircraft Electronic Sensors.
2. PHO-TR524 Earth Resources Production Processing Requirements for EREP Electronic Sensors.
3. PHO-TR543 Earth Resources Data Format Control Book, Volume 1, Sections 1.0 through 6.13.
4. MSC-05528 Skylab Program, Earth Resources Experimental Package Sensor Performance Report:
  - a. Vol. I (S190A): SL2 Evaluation; SL2/3 Evaluation.
  - b. Vol. VII (S190B): Engineering Baseline and SL2 Evaluation; Engineering Baseline and SL2/3 Evaluation.
  - c. Vol. III (S192): Engineering Baseline and SL2 Evaluation; Engineering Baseline and SL2/3 Evaluation.
5. MSC-07744 (Revision B) Skylab Instrumentation Calibration Data, Volume IV, Skylab Mission SL-1, Earth Resources Experimental Package (EREP), Experiment Calibration Data.

We would like to be sure that in addition to receiving the master documents requested, that Weber also be put on the mailing list to receive all future revisions.

#### C. Expected Accomplishments.

1. Manitou, Colorado - range inventory site (161313).

We expect to complete the transfer and placement of all PI training and testing point locations to the S190A and S190B photographic products and support A/C photography from Missions 239 and 248.

We expect to complete writing PI descriptors for the S190A, S190B, and support aircraft photography and initiate formal and comprehensive PI testing of these products. Photo interpretation testing will be for specific vegetation classes described and discussed with Forbes and Greenberger. These classes are in accordance to the ECOCLASS system of classifying plant communities. A copy of the description of ECOCLASS, its genesis, and definitions is being forwarded to PIMO for their perusal.

## 2. Augusta, Georgia - forest inventory site (177512)

With the aircraft support photography, we will complete preliminary ground truth maps for three 10,000-meter-square test sites. These ground truth maps will be ground checked in late November or early December if additional funds become available for travel. The ground truth maps will be used to verify computer maps produced by PSW classification procedures using photographic film densities measured with a scanning microdensitometer.

Using aircraft support photography, the forest area will be mapped for one county included in the Augusta site that is covered by SL-4 S190B photographs. This map will be ground checked in November or December if additional Skylab funds are available. The forest area in the county, and the area in other land-use classes as well, will be determined by a very intensive acreage count--a dot grid with one dot per acre will be used for this purpose. The acreages derived from this procedure will be used as a model to test sampling designs and sample intensity for use on Skylab photographic data.

Forest Survey plot locations for four counties included in the Skylab S190B coverage will be requested from the Forest Survey Unit in Asheville, NC. The plot locations on 1:20,000 panchromatic photographs will be relocated on 1:120,000 CIR high-altitude photography taken in April 1974 and on 1:125,000-scale map sheets. This work will be in preparation for evaluating Skylab photographs as a substitute for conventional photography on Forest Survey.

Microdensitometer techniques will be developed preparatory to measuring film densities for computer classification of forest and nonforest land classes.

### D. Significant Results, Practical Applications, and Operational Problems

#### 1. Manitou, Colorado - range inventory site (161313)

Road systems being developed within the Manitou area for human habitation are readily discernible on the S192 normal-color photographs. These are dirt roads, some of which are about 20 feet wide. These data should provide the District Ranger of the Pike National Forest required information on the size and extent of these developing areas--information he does not now have but is required for total management of his District.

### E. Travel Plans - September 16 to November 16, 1974.

None