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QUARTERLY PROGRESS REPORT

New England Reservoir Management
EREI Investigation #089
Report for the Period
23 April 1974 - 23 July 1974

NASA CONTRACT NO. T4646-B

Principal Investigations Management Office
Lyndon B. Johnson Space Center
Technical Monitor: Martin L. Miller

Principal Investigator: Mr. Saul Cooper
New England Division, Corps of Engineers
Waltham, Massachusetts 02154

Co-Investigator: Dr. Duwayne Anderson
U.S. Army Cold Regions Research
and Engineering Laboratory
Hanover, New Hampshire 03755

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Earth Resources Experiment Package (EREP)
Progress Report #5 - 23 July 1974
Investigation #089
New England Reservoir Management

Principal Investigator:
Mr. Saul Cooper, New England Division
Corps of Engineers, Waltham, Mass. 02154

Co-Investigator:
Dr. Duwayne Anderson, U.S. Army Cold
Regions Research & Engineering Laboratory
Hanover, New Hampshire 03755

During the reporting period our Skylab technical monitor requested and received a special interim contract report consisting of an analysis of: ERTS-1 Multispectral Scanner imagery obtained 10 August 1973, Skylab 3 S190A and B photography, track 29 taken 21 September 1973, and RB-57 high altitude aircraft photography acquired 26 September 1973. The objectives were:

a. To make quantitative comparisons between high altitude aircraft photography and satellite imagery.

b. To prepare and validate, as a demonstration project, the extent to which high resolution (S190A and B) space-acquired data can be utilized for land use/vegetation mapping and management of drainage basins.

The test site was a 124-square-km area of the lower Merrimack River estuary as it contained the largest variety of land use and vegetative classification units in the Merrimack River Basin (this basin is a primary test site for our EREP Investigation). A modified version of the USGS Land Use Classification System (USGS Circular 671) was used for the mapping in this report.

Ground resolutions determined by inspection of the various data products are given in Table 1. Among the various types of imagery, as the ground resolution improved, the number of mapping units discernable and mapping accuracy increased.

TABLE 1
GROUND RESOLUTION

	<u>ERTS-1</u>	<u>S190A</u>	<u>S190B</u>	<u>RB-57</u>
Linear features (meters)	70	25	12.5	5
Circular features (meters ²)	24,300	4,900	3,200	800

Imagery from the three satellite data products were enlarged to approximately 1:800,000, 1:400,000, 1:200,000 and 1:63,360 to determine the most useful scale for mapping. The detail on the small scale imagery (1:800,000 - 1:200,000) was sufficient but not practical for level I land use/vegetation mapping. The 1:63,360 scale was selected because: (1) the units were of sufficient dimension to enable accurate mapping and data transfer, (2) this scale corresponds to the 15-minute quadrangle sheets, (3) at larger scales the S190A photography begins to have a "grainy" appearance, and (4) the scan lines on the ERTS-1 imagery become prominent, reducing image clarity.

Land use/vegetation maps were prepared from black and white contact prints of ERTS-1 MSS 5 (0.6 - 0.7 u wave length) imagery, S190A (0.6 - 0.7 u wave length) photography, S190B color infrared (CIR) photography and RB-57 CIR photography. All imagery was contrast enhanced photographically to portray the maximum number of gray tones.

From our comparison of land use/vegetation mapping the Skylab S190B photography compares favorably with the RB-57 photography and is much superior to the ERTS-1 and Skylab S190A imagery. For most purposes the 12.5 meter resolution of the Skylab S190B imagery is sufficient to permit extraction of the information required for rapid land use and vegetation surveys necessary in the management of a reservoir or watershed.

A questionnaire regarding the effectiveness of the aircraft support provided to our Skylab EREP project was returned to NASA on 15 June 1974 as requested. In July, a CRREL representative attended the EREP Principal Investigators Data Meeting in Houston, Texas.

Minor changes in our milestone chart have been made as processing difficulties at the NASA Houston facility caused delays in receipt

of our Skylab imagery. Future work will include an evaluation of a computer data processing technique in cooperation with the Goddard Institute for Space Studies, New York City to quantitatively analyze spectral radiance values on the S192 multispectral data for imagery obtained over the Merrimack River basin. Flood plain and land use/vegetation mapping will also continue.

Milestones	1973												1974												1975	
	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F			
Preflight Simulation and Investigation Planning	██████████																									
Alert Status for ERTS-1 - Skylab Ground Truth Acquisition				████████████████████																						
Expected Receipt of Skylab Imagery									██																	
Flood Plain Mapping													████████████████████													
Vegetation/Land Use Mapping of Merrimack River Basin													████████████████████													
Preparation of Final Report																						△				
Submission of Final Report to Contract Monitor																							△			
Distribution of Final Report																							△			

Remarks
This chart has been updated to reflect Skylab mission status as of 23 July 1974