Investigations Using Data in Alabama from ERTS-A

Contract NAS5-21876

Second Bi-Monthly Progress Report
Covering Period December 7, 1972-February 9, 1973

The following items are those listed on page 3 of the contract document as the minimum contents of the bi-monthly progress reports.

a) Title of Investigation with ERTS-A proposal number: "Investigations Using Data in Alabama from ERTS-A." Proposal No. 271.

b) GSFC identification number of the principal investigator: Dr. Harold R. Henry (UN604).

c) A statement and explanation of any problems that are impending the progress of the investigation. See the discussion of the poor quality of imagery and of the delay in receiving data in the following sections.

d) A discussion of the accomplishments during the reporting period and those planned for the next reporting period: See the following sections for progress in each of the areas of the project.

e) A separate discussion of significant results: See separate sections which follow.

f) There were no published articles during this period.

g) Recommendations concerning practical changes in operations: Improve quality of visual imagery and decrease time lag for receipt of data.

h) No completed ERTS Image Descriptor Forms.

i) No changes in standing order forms.

j) No retrospective data request forms were submitted.

(E73-10509) INVESTIGATIONS USING DATA IN ALABAMA Bimonthly Progress Report, 7 Dec. 1972 - 9 Feb. 1973 (Alabama Univ., University.) 31 p HC $3.75 CSCL 08F

N73-22284

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APPENDIX I

To: Dr. H.R. Henry, Director, ERTS Project

From: R. Paul Wilms, Grad. Research Asst.

Subject: Progress Report (December 7, 1972-February 9, 1973)

Date: 9 February, 1973

(1) An initial analysis of the ERTS-I data that has been received was attempted utilizing a standard light table, a lantern slide projector, and an I^2S Mini-Addcol viewer, the latter being used only to verify particularly troublesome areas.

When this first analysis was made, ground information was deduced by comparing the data imagery to existing maps. By this process, water bodies, rivers, major highways, gross geologic features, and vast forestlands could be determined. Agricultural areas were identified from their rectangular shape in the data, but it was impossible to determine at this point what the ground cover was. Urban areas were especially prominent.

There were instances of surprising detail in this initial study, for example, in the case of the confluence of two small rivers south of Luverne in Crenshaw County. Strip pits and it is believed even small rock outcroppings are evident on the imagery. Small airport runways are also readily discernable.

Some of the reservoirs, as well as Mobile Bay, demonstrated at least two spectral characteristics which could not be definitely explained in interpretation of

the imagery. The differences in spectral characteristics were especially striking in bands 4 and 5 (visible wavelengths) of the MSS data, where one lake would have a relatively high response while another lake or another part of the same lake had a relatively low response. It has not been determined whether the differences in response were due to turbidity or depth or to a combination of the two factors.

In general, this preliminary and admittedly shallow investigation allowed spectral definition of a number of interesting and perhaps even significant features, but the significance of these results could not be accurately judged because of a lack of information concerning the actual cover types in the various areas. As expected, this first-look study generated many specific questions concerning the cause of variations in spectral response and the cover type present in several locations.

One of the most interesting features defined by this study involved the trend in agricultural patterns in Montgomery County. The bulk of the agricultural activity seems to follow those areas underlain by the Selma Group and the Eutaw and McShan Formations. If this is the case, spectral variation due to changes in vegetative cover may provide a clue as to subsurface geology in this and other areas. The relationship between spectral response, moisture conditions, vegetative density, and underlying geologic features and their moisture content

is not known and is beyond the scope of this study, but based upon this initial investigation, it is this investigator's belief that vegetation density and type is indicative of the underlying geologic and soil characteristics.

The results of just this casual observation of ERTS-I imagery indicates a great deal of potential. It is hoped that by utilizing existing ground truth data and developing a procedure for utilizing a clustering algorithm in the analysis technique, amore detailed and refined analysis can be pursued.

(2) The investigation of ERTS-I data described above was a very limited one and was on a very small scale. Large scale interpretation and analysis of ERTS-I imagery, however, has been hampered by the almost non-existent flow of data from the Marshall Space Flight Center photo processing laboratory. Their new plant is now 50% operational and the data flow should therefore improve in the near future. Inquiries to other photo processing laboratories, including the University's own Audio-Visual Department, have reinforced the conclusion that having NASA-Marshall process the data is best for all concerned. Data received to date is indicated by Fig. 1, a-d.

(3) Meanwhile, preparations for interpreting and utilizing ERTS-I data on a grand scale have continued. Two plexi-

glass rear-viewing screens have been constructed and set in place. Lantern-slide projectors should arrive shortly.

In conjunction with the ERTS project overall and as part of this investigator's thesis topic, a target study area has tentatively been selected for detailed investigation using ERTS-I imagery. The area to be considered consists of nine counties: Autauga, Elmore, Macon, Lowndes, Butler, Montgomery, Bullock, Crenshaw, and Pike (Fig. 3). It corresponds to the Alabama Planning and Developement Districts 9 and 5. It is especially suited to a study such as this. It encompasses ten different geologic substrata which may exert an influence on surface features and landuse. Rivers and lakes, both man-made and natural, are plentiful. The city of Montgomery will provide a means of mapping urban sprawl or regression using space-acquired data. Further, smaller towns will provide a key as to the minimum urban area readily identifiable by ERTS-I data. The target area also exhibits varying topography, vegetative cover, and land use all of which hopefully will be detectable by ERTS. The entire nine-county area is not highly industrialized and therefore ground features should not be distorted or obscured by atmospheric smoke and haze.

Through detailed examination of particular land use categories, specific patterns of developement may emerge, on the basis of which, certain trends can be predicted. It is expected that the information derived from the

mapping and tabulating of data during the course of this investigation will indicate a definite trend towards intensification of land use. It is the purpose of this study to determine the capability of ERTS-I data to document these changes.

(4) Finally, preparations are nearly complete for a bi-weekly ERTS-I seminar to begin on or about March 13, 1973. This seminar will offer academic credit to interested students and will also serve to stimulate and maintain liaison with user agencies and others outside the college community.

Respectfully submitted,

R. Paul Wilms

Figure 1 (a)

DATE: 9 - 12 September, 1972

ORBIT	SCENE	9½" POS. PRINT 4 5 6 7	9½" POS. TRANS. 4 5 6 7	70mm POS. TRANS. 4 5 6 7
J 9 Sept.	1 2 3 4 5		153 184 215 246 154 185 216 247 155 186 217 248 156 187 218 249 157 188 219 250	
K 10 Sept.	1 2 3 4 5			
L 11 Sept.	1 2 3 4 5	031 066 101 136 032 067 102 137 033 068 103 138 034 069 104 139 035 070 105 140		
M 12 Sept.	1 2 3		042 087 177 043 088 178 044 089 179	

COMMENTS: Scene location given on index map (fig 2)

Figure 1 (b)

DATE: 27-30 September, 1970

ORBIT	SCENE	9½" POS. PRINT 4 5 6 7	9½" POS. TRANS. 4 5 6 7	70mm POS. TRANS. 4 5 6 7
J 27 Sept.	1 2 3 4 5		023 049 075 101 024 050 076 102 025 051 077 103 026 052 078 104	
K 28 Sept.	1 2 3 4 5			
L 29 Sept.	1 2 3 4 5		062 075 088 101 063 076 089 102 064 077 090 103 065 078 091 104	
M 30 Sept.	1 2 3		290 324 358 392 291 325 359 393 292 326 360 394	

COMMENTS: Scene location given on index map (Fig 2)

Figure 1 (c)

DATE: 15 - 18 October, 1972

ORBIT	SCENE	9½" POS. PRINT 4	5	6	7	9½" POS. TRANS. 4	5	6	7	70mm POS. TRANS. 4	5	6	7
J	1	109	132	155	178	109	132	155	178	109	132	155	178
15 Oct.	2	110	133	156	179	110	133	156	179	110	133	156	179
	3	111	134	157	180	111	134	157	180	111	134	157	180
	4	112	135	158	181	112	135	158	181	112	135	158	181
	5	113		159	182	113	136	159	182	113	136	159	182
K	1												
16 Oct.	2		110	143	176	077	110	143	176	077	110	143	176
	3		111	144	177	078	111	144	177	078	111	144	177
	4		112	145	178	079	112	115	178	079	112	145	178
	5		113	146	179	080	113	146	179	080	113	146	179
L	1	174	197	220	243	174	197	220	243	174	197	220	243
17 Oct.	2	175	198	221	244	175	198	221	244	175	198	221	244
	3	176	199	222	245	176	199	222	245	176	199	222	245
	4	177	200	223	246	177	200	223	246	177	200	223	246
	5	178	201	224	247	178	201	224	247	178	201	224	247
M	1	036	055	074	093	036	055	074	093	036	055	074	093
18 Oct.	2												
	3												

COMMENTS: 1 scene on orbit I dated 14 Oct. was also received, numbers:

031
062
093
124

scene location given on index map (fig 2)

Figure 1 (d)

DATES: 2 - 5 November, 1972

ORDER	SCENE	9½" POS. PRINT 4 5 6 7	9½" POS. TRANS. 4 5 6 7	70mm POS. TRANS. 4 5 6 7
J (2 Nov)	1		023 050 077 104	
	2		024 051 078 105	
	3		025 052 079 106	
	4		026 053 080 107	
	5		027 054 081 108	
K (3 Nov)	0		033 071 109 147	
	1		034 072 148	
	2			
	3		074 112 150	
	4		037 075 113 151	
	5		038 076 114 152	
L	1			
	2			
	3			
	4			
	5			
M	1			
	2			
	3			

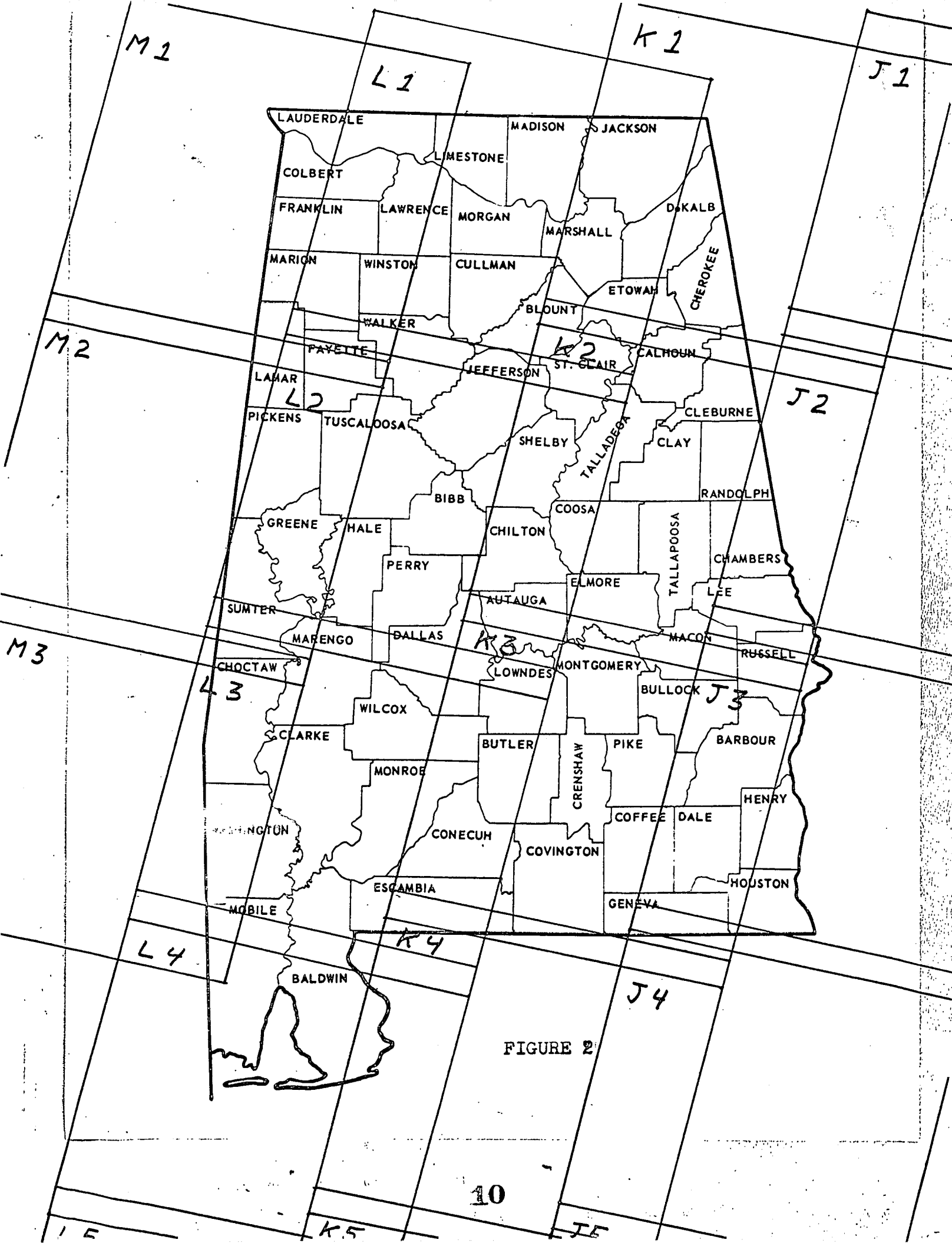
M1
L1
K1
J1
M2
L2
K2
J2
M3
L3
K3
J3
L4
K4
J4
L5
K5
J5
LAUDERDALE
MADISON
JACKSON
LIMESTONE
COLBERT
FRANKLIN
LAWRENCE
MORGAN
MARSHALL
DeKALB
MARION
WINSTON
CULLMAN
ETOWAH
CHEROKEE
BLOUNT
WALKER
FAYETTE
CALHOUN
ST. CLAIR
JEFFERSON
LAMAR
PICKENS
TUSCALOOSA
SHELBY
TALLADEGA
CLEBURNE
CLAY
RANDOLPH
BIBB
COOSA
GREENE
HALE
CHILTON
TALLAPOOSA
CHAMBERS
PERRY
ELMORE
LEE
AUTAUGA
SUMTER
MARENGO
DALLAS
MACON
RUSSELL
CHOCTAW
LOWNDES
MONTGOMERY
BULLOCK
WILCOX
CLARKE
BUTLER
CRENSHAW
PIKE
BARBOUR
MONROE
HENRY
COFFEE
DALE
CONECUH
COVINGTON
ESCAMBIA
HOUSTON
GENEVA
MOBILE
BALDWIN

FIGURE 2

Figure 3

▨ - Counties selected for detailed investigation

APPENDIX II

BI-MONTHLY PROGRESS REPORT

Environmental Area

by G. P. Whittle

The work in progress on the environmental phase of the ERTS project is concerned with determining the optimum monitoring sites for placing data collection platforms in the Warrior River. To date, the majority of the preliminary work involved in this study has been completed.

As an aid to selecting possible sites for DCP placement, a tracing of the appropriate section of the Warrior River has been prepared with the following items located on the tracing: (1) major industries, (2) main tributaries to the river, and (3) strip mining operations near the river. Also, to be included on this tracing are locations of all monitoring stations which measure the DCP parameters on the reach of the river under consideration. In addition to locating these monitoring stations, work is in progress to assemble the average values of the DCP parameters obtained during the months of the previous summer. This data is indicative of the water quality during the most recent critical period of river flow. The data for the DCP parameters at these stations will be obtained from the Environmental Protection Agency's STORET system which contains water quality data for the majority of monitoring stations in the state. Stations for which data is to be retrieved have been chosen, and the retrieval of the data will be performed in the next phase of this investigation.

It is anticipated that the data collection platforms, once installed, will require maintainence and servicing on a weekly basis. Contact has been made with the U. S. Army Corps of Engineers, Tuscaloosa Office, in regard to obtaining the use of a suitable boat for this purpose. The

initial response from the Corps of Engineers was encouraging and it planned to contact the district office in Mobile in regard to reaching a formal agreement for the use of a boat on a regular schedule.

It is anticipated that selection of the DCP location sites will be completed in the very near future.

B

APPENDIX III

Procurement of Equipment and Supplies

by Lee Miller

Equipment under order includes two Charles Bessler, Slide King, Lantern Slide Projectors. These are to be used to magnify and superimpose 70 mm ERTS images for land use coding. The delivery has been extensively delayed for several reasons. A period of approximately three weeks elapsed from the date the purchase order was submitted to when a requisition was issued to the supplier. The projectors were not in supply and were back ordered from the factory by the supplier in Birmingham. The delivery has now been further delayed by back orders at the factory that have apparently taken weeks to fill. The supplier has loaned a projector until the delivery date but this has been inadequate because of a difference in specifications from the ordered projectors.

All other equipment has been ordered and received. This includes two screens, filing cabinets, and frames for the 70 mm ERTS frames.

Examination of ERTS Images

Whereas all ERTS images we had received were reproductions from Marshall Space Flight Center, we received the originals for one set of coverage. Examination of this set of images was very encouraging. Individual fields were readily discernable. The agricultural regions were bounded by forest which tended to follow the stream beds. Built up areas were apparent and the interface with open land was distinct in many cases. Along interstate highways the segments that were under construction were far more distinct because of the wide band of barren land that is temporarily created. The large borrow pits along the route can also be located.

Examination and Classification of U-2 Photographs

High altitude U-2 photographs were received, covering the Mobile County and Baldwin County areas, as well as a line of photographs along the Black Warrior - Tombigbee River system from immediately below Tuscaloosa on the Black Warrior to Jackson on the Tombigbee. These photographs were at a scale of 1:65,000 on the 9 x 9 images. The 70 mm images that were sufficiently clear of cloud cover, to be useful, were mounted for use in lantern slide projectors. The locations of the frames were represented on a 1:1,000,000 map of the state and then catalogued.

The quality of these images was outstanding. The resolution was good enough to see the stripes on an airstrip. It is expected that these images will be of great value as ground truth data in the analysis of ERTS images.

Thesis Research

During this period I was able to find an area of study in the ERTS project compatible with my interest for a master's thesis. The data used in this study will include air photographs taken at 12,000 feet, air photographs taken at 50,000 feet, and the ERTS data on computer tapes. The resolution of the ERTS images is roughly 200 feet. Consequently, each data point from ERTS represents an area approximately 200 feet square. On each of the four bands there are fifteen gray scale values the point may have. What I hope to do is relate the combination of gray scale values for each data point to the ground truth from the air photos. The immediate consequence of this is to define the spectral signatures of land use beyond the primary land use catagories. The other objective

beyond the definition of the spectral signatures will be to evaluate the capability of each level of remote sensing for delineation of land use.

APPENDIX IV

BI-MONTHLY PROGRESS REPORT

by R. Q. Shotts

During this period, the location of limonite iron ore areas and limonite surface mines in Crenshaw County, Alabama, were plotted on a county road map and the October 17 ERTS photographs available (9 x 9 prints) studied to see if it is possible to distinguish surface mines from other treeless areas, such as fields. It proved not possible at that scale.

Early in February, I was a member of a party visiting the Remote Sensing Laboratory at Marshall Space Flight Center in Huntsville, Alabama. We viewed a number of October 17 ERTS photographs of Alabama, Georgia, and Tennessee, in color combinations, and obtained prints of some of these.

A series of four to six seminars on ERTS data applications for prospective users, and others, are being organized to begin Tuesday, March 13. Some topics have been selected and some prospective speakers and leaders approached.

APPENDIX V

DATA PROCESSING ACTIVITIES

by

E. T. Miller

The data processing activities have been involved with two primary areas during the last two months. The first of these has been the completion of the base file of ground truth data for land-use, and the second has been the refinement of programs to handle the data available.

The land-use data extracted from aerial photo mosaics has been coded and stored for approximately 95 percent of the State. Work is continuing on key-punching activities associated with this storage operation. Errors have been detected in the storage of information which delimits county boundaries, and steps are being taken to correct these erroneous entries.

A summary program has been developed to provide a report of total area within a county devoted to each of the six land uses. The output includes the number of cells recorded within the county having each landuse by percentage of the cell covered (i.e. number of cells with 30 percent forest land, etc.); the acreage represented in these land-use categories; and the percentage of the county represented in these land-use categories.

The land-use mapping program has been expanded to permit maps to be generated showing the dominant land-use in each cell. The land-use having the largest percentage in the cell is coded as the dominant use. Ties are broken by a priority system ranking the uses as urban, agricultural, forest, water, barren, and non-forested wetland in sequence from highest to lowest priority for classification.

APPENDIX VI

ERTS BI-MONTHLY PROGRESS REPORT

by Glenn Pritchett

Summary of Activities

Due to the obvious lack of ERTS-1 products, the current phase of project activity has been concerned with organization of specialized research and preparation for working with anticipated imagery. This imagery-related activity, including the setting up of viewing equipment, the cataloguing of transparencies already received and systematically checking previous work is reviewed more fully in another section. The products currently being viewed somewhat prompted encouragement especially in view of the possibility of receiving more workable reproductions, although the reality of such a small scale product remains a matter for concern.

Thesis Research

During this report period, organization and implementation of a thesis research topic directly related to the ERTS-1 project has been accomplished. A projection of the geographic diffusion of gypsy moth (Portheria Disper) infestation and its potential impact on southern forests in general and Alabama in particular provide the primary theme of this study. Thermal infrared low altitude photography and U-2 products will be utilized where possible. Otherwise, ERTS imagery will be used in correlating New England forests (present infestation area) with possible similar types in the Southeast, delineating a natural corridor for population spread, and distinguishing possible Alabama target areas with a 50% preferred host stands as the main criterion for determining

susceptibility. It is believed that with the help of the Symap computer program, a series of maps can be manufactured from existing data showing progressive population movements and potential infestation areas to serve as the final product of this research. There also exists the contention that a beneficial by-product of this effort will be the development of techniques for future use of remotely sensed imagery in monitoring the status of other potentially damaging forest insects.

Historical Background

The gypsy moth (Porthetria Dispar) is a forest insect native to Eastern Europe and Asia where it causes moderate and infrequent damage. In 1869 a French biologist introduced gypsy moth eggs into Medford, Mass. in hopes of producing a sturdy strain of silk-producing insect by crossing the gypsy moth with the silkworm moth and raising it in a very conducive environment. However, these larvae escaped from the Medford experiment; thus, the current gypsy moth infestation in the northeastern United States (U. S. D. A., 1970).

During the years of habitation of this favorable environment, it has spread over 200 thousand square miles, defoliating forest and ornamental trees. The insect is now established in all or portions of nine states from Maine to New Jersey. Past records of infestation within this area have shown preferred hosts to consist mainly of hardwoods, but older larvae may feed successfully on pine, cedar or spruce (Mosher, 1915). These conifers are usually killed by one season of complete defoliation while hardwood species may be killed by two successive years of defoliation (Campbell, 1970). Hardwood stands in the Northeast are generally less susceptible to damage if they contain less than 50 percent of the preferred hosts (Bess, et al., 1947). In areas of 50 percent plus preferred hosts there is generally a three to five year phase following introduction in which the insect becomes generally distributed at low densities throughout the region. Phase two may bring a population explosion throughout the entire area for several years in succession. Eventually a population collapse occurs followed by local abundance on the more susceptible upland oak sites (U. S. D. A., 1970).

The potential threat of the gypsy moth to southern forest resources has been analyzed by several over the past 40 years. On the basis of suitable host presence, the insect is expected to eventually occupy the entire region in which oaks are a component of the forest stands (Perry, 1955). Evidence

is accumulating to indicate that Southern hardwood forests might be highly susceptible to defoliation thus experiencing greater mortality than occurred in the Northeast (Anon., 1970). This factor, combined with a milder climate and virtual predator-free habitat, offers some very bleak possibilities.

Bibliography

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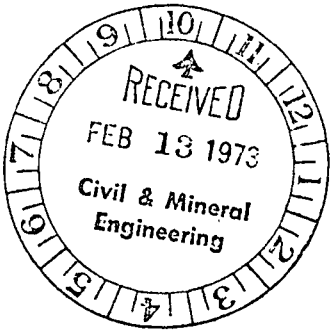
U. S. D. A., Agricultural Research Service, Plant Protection Division. "Federal and state protection programs-gypsy moth", Cooperative Economic Insect Report #20(37), 1970.

APPENDIX VII

Marine Science Programs THE UNIVERSITY OF ALABAMA
TUSCALOOSA / BIRMINGHAM

February 8, 1973



MEMORANDUM

TO: Dr. Harold R. Henry

FROM: Dr. C. Everett Brett

SUBJECT: Second Bi-Monthly Progress Report

Most of the activities of the Marine Science Program to date have been centered around preparing the marine vessels for ground truth activities.

Conversations with Mr. Rex Morton indicate that the DCP being constructed for use in Mobile Bay will be mounted on three floats radiating from the center and mounted at an angle of 120° from each other. Total diameter will be 12 feet. We have had to design a special lifting apparatus to move the buoy from deck to the water and for later servicing.

Another problem is accurate location of the buoy in the marine environment. I have contacted the Commander of the U.S. Air Force Radar Squadron on Dauphin Island and he has agreed to give us percision locations with his sophisticated radar equipment.

Some of the ERTS 1 photography has been examined to see what can be expected in terms of usable information. Our initial impressions will be used to locate the DCP and for setting up the sampling transects.

We have been contacted by the U.S. Corps of Engineers in Mobile to do a study of sedimentation caused by the maintenance dredging in Mobile Ship Channel. When that dredging begins ERTS data will be examined to see if it can be used to delineate the extent of the sedimentary plume.

The Marine Science Program has a contract with the Alabama Development Office to do environmental studies of potential superport sites in the Northeastern Gulf of Mexico. We intend to use ERTS data to trace currents using the turbid flows coming out of the passes in the Mississippi River Delta and the inlets along the shoreline as indices of movement to aid in determining where the safest location might be in reference to potential oil spills.

I have also hired a physical oceanographer, Dr. William Schroeder, whose duties will be, in part, to aid in the interpretation of ERTS data in the coastal zone. Dr. Schroeder reported for duty on February 1 this year.

C. E. B.

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APPENDIX VIII

by

T. Pauldan and R. Cummings

Experimentation has continued in making color composites from the 70 mm B&W chips, using the I^2S multispectral viewer. Exposure time and intensity readings have been determined for each channel. Color types are SO-373 and SO-360. Color composites thus produced are good quality, and we are now ready to produce them as requested for the Alabama ERTS project. The produced composites may also be analyzed directly on the viewer without the necessity of making the color transparencies.

Problems: Ohoto reproduction problems have delayed distribution of data to various participants.

Accomplishments: Four ERTS bulk multi-digital tapes of the Huntsville area, ID #1050-15544, have been received. These are being reformated and the spectral data have been collated for input to our unsupervised classification programs.

Plans: Performance of multi-spectral analyses and land use classification of the Huntsville jetplex and surrounding area using the digital tapes. Evaluate results by comparison with RB-57 photographic results and ground truth information presently available at MSFC.

APPENDIX IX

SECOND BI-MONTHLY REPORT

December 8, 1972 - February 9, 1973

Report of the Geological Survey of Alabama
for the project entitled

INVESTIGATION USING DATA IN ALABAMA FROM EARTH RESOURCES TECHNOLOGY SATELLITE (ERTS-B)

Compiled By

James A. Drahovzal
Principal Investigator for the
Geological Survey of Alabama

February 9, 1973

This report describes the activities of the Geological Survey from December 8, 1972 to February 9, 1973.

The major problem still plaguing the Survey's progress during the period of this report is that of data supply. The only data received during the two-month period was some supplied on February 7, 1973. That data, for the most part, was under-exposed and much of the area cloud-covered. This data, however, is now the subject of a more detailed analysis. A collection of data was borrowed for two weeks during the Holidays and some limited work accomplished. We have yet to receive data in a form appropriate for field work or in a form reproducable by our photography laboratory for field use. Although 70 mm. negatives have been on order for more than two months, we have not yet received them. This situation is a constant irritation to many of our workers and is placing the entire project much behind schedule.

As a result, much of our work has proceeded with borrowed data or with data received through other sources. The following describes some of the activities which have been carried out.

While some of the ERTS data was on loan to the Survey during the Holidays, some color compositing was attempted using bands 4, 5, and 7. So far results have been disappointing because of registration problems and problems with color balance. In checking with NASA officials and with the EROS Data Center, some specific suggestions on technique have been noted. When, we once again receive 70 mm. data, these techniques will be employed.

U-2 data collected September 24, 1972, was quickly viewed by most of the Survey's research team in late January. The data includes the area in the vicinity of Mobile Bay and the Mobile River north to the confluence of the Alabama and Tombigbee Rivers. Known faults were searched for without success, but a known radial anomaly near Fairhope was discernible.

In some more recently initiated research, the U-2 data is being used along with the AMS 1:250,000 maps of Mobile Bay as "ground truth" in a change detection study based on ERTS data. Using 70 mm. positives and negatives (1014-15555-3, 7, and 1032-15555-7) acquired through two other projects (an EROS-funded project and products purchased by the Survey from EROS Data Center for a superport project), the 70 mm. products were photographically enlarged to a scale of 1:250,000 and compared directly with the currently available AMS 1:250,000 maps of Mobile Bay (The Pensacola, Florida, Alabama sheet - 1957, revised 1966 and the Mobile, Alabama, Mississippi sheet - 1953, limited revision, 1962). The differences in the coastline and in the delta are currently being recorded and it is hoped that these can be related to mechanisms and processes active in the bay region. The U-2 data will be used to verify and check the interpretation made using the ERTS imagery. The U-2 data is currently being mosaicked for this purpose, and will subsequently be reduced to 1:250,000 for comparison. Already the small-scale and near-orthographic nature of the imagery afforded by ERTS without time-consuming mosaicking, is seen to be advantageous in making quick assessments of this kind. This study will be pursued in the next two months and its results evaluated at that time.

The Geological Survey was able to borrow a copy of a 20" x 20" positive color composite of the Montgomery, Alabama, scene (1067-15495-4,5,7) from the Alabama Development Office (purchased from EDC) for approximately a week. The scale reported to be 1:500,000 was actually 1:509,500. Overlays were constructed which defined the important and readily visible cultural features and the salient geological features, particularly lineaments and circular features. The geology of the area was fitted to the frame using the geologic maps of Watson Monroe (1941) for the Cretaceous rocks and F. Stearns MacNeil (1946) for the Tertiary rocks. It was noted that a great number of small lakes and ponds are present in the area of the Selma Group outcrop belt. To the east where the Selma becomes more silty and sandy, the belt exhibits fewer lakes and ponds and appears to be more forested. The less silty Selma is rather clearly defined or the photograph by the lack of forest cover. The drainage density in the Selma is more coarse than throughout most of the area shown in the frame with the exception of the eastern silty facies where it is much finer. The drainage density of the Tertiary is fine and most of it is heavily forested. The Tuscahoma Sand is nearly mappable from the photograph because of the denser forest cover when compared to the overlying and underlying formations.

Because of the relatively brief working time with the color composite, more detailed analyses were not possible; however when this color composite becomes available through the NASA program, it is hoped that a quantitative drainage analysis may be performed and related to the structural and stratigraphic factors.

It is hoped that the flow and quality of data being supplied may be soon improved. If the situation persists, the efficient execution and timely completion of this research will be markedly hampered.

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February 9, 1973

O F F I C E M E M O R A N D U M

TO: Harold Henry, ERTS-1 P.I.

FROM: Geological Survey ERTS-1 Co-Investigators

SUBJECT: ERTS-1 Data Quality

Analysis of ERTS-1 data received by GSA on February 7, 1973, indicates that a significant reduction in quality has taken place. The acquired data consist of 9 x 9 positive transparencies flown on the following dates along the indicated ground tracks:

September 9, 1972	Orbit J
September 12, 1972	Orbit M
September 29, 1972	Orbit L
September 30, 1972	Orbit M
November 2, 1972	Orbit J
November 3, 1972	Orbit K

The reproduced data lack definition and have a "fuzzy" appearance, possibly due to the use of depleated developing chemicals. Areas that should be black appear in a dark grayish tone. The reduction in quality is not due to cloud cover since the gray scale is also "fuzzy" and washed out. We find these data to be almost totally useless for our investigations.

Comparison with data acquired directly from GSFC indicates that the quality of our data is at best very poor. We recommend that steps be taken to either improve the present processing of data or seek new methods and routes of data handling and processing.

C. C. Wielchowsky
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