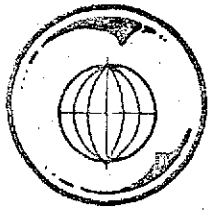


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TEXAS A&M UNIVERSITY  
REMOTE SENSING CENTER  
COLLEGE STATION TEXAS 77843

College of Agriculture  
College of Engineering  
College of Geosciences  
College of Science

TYPE I PROGRESS REPORT-NUMBER 7

Period: March 28, 1974 to May 27, 1974

TITLE: MONITORING THE VERNAL ADVANCEMENT AND RETROGRADATION (GREEN WAVE EFFECT) OF NATURAL VEGETATION (MMC 667) (Contract No. NAS5-21857)

PRINCIPAL INVESTIGATOR: Dr. J. W. Rouse, Jr. (UN220)  
Remote Sensing Center  
Texas A&M University  
College Station, Texas 77843

PROJECT DESCRIPTION:

This regional study monitors the vernal advancement and retrogradation of natural vegetation (green wave effect) using ERTS observations throughout the Great Plains Corridor. The green wave effect is charted by using the relatively homogeneous rangeland vegetation systems of the Mixed Prairie region in the central United States as phenological indicators. ERTS multispectral scanner data and ground observations collected from the network of ten test sites are used to measure vegetation changes during the life-time of ERTS-1. Attention is given to observing seasonal drought and other bioclimatic influences which impact upon management and production in agriculture. The overall objective of this investigation is to determine the effectiveness of ERTS-type data in monitoring the vegetation conditions of direct concern to rangeland management and agri-business decisions in this region.

"Made available under NASA sponsorship in the interest of early and wide dissemination of Earth Resources Survey Program information and without liability for any use made thereof."

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## ACCOMPLISHMENTS:

During the period covered by this report, the following tasks were accomplished:

- a) Computer analyses of MSS digital data were continued during the reporting period for routinely located and extracted test site areas and subsite areas. Means, covariances, band ratio parameters, and the TVI (transformed vegetation index) values have been calculated for these data sets.
- b) A computer program was developed to graph ERTS radiance values and calculated parameters against time on a CAL-COMP Plotter for test site area and subsite area data.
- c) Additional weather data for the test sites has been compiled and coded for computer analysis.
- d) Computer ground data summaries were updated to include all data currently on file.
- e) Image Descriptors were assigned for ERTS-1 imagery containing good quality Great Plains Corridor network test site data not previously described (Appendix).
- f) Procedures for classifying and formatting resource and land use information for routine computer extraction and analysis for the ten

test sites were summarized in Technical Report RSC-54.

- g) Selected regression analyses were completed, graphical materials prepared, and Type II, Number 3 progress report was written.

#### SUMMARY OF SIGNIFICANT FINDINGS:

From the data that have been analyzed thus far, it is apparent that certain parameters of the vegetation (i.e., green biomass and vegetation moisture content) are well correlated with ERTS data at some sites, yet the relationship is poor at other locations. This is primarily explained by the wide variety of resource types, heterogeneity of vegetation, range of production and imposed treatments at some locations. It appears that weather parameters that influence the plant-water status of vegetation dramatically influence the relationship of green biomass to ERTS MSS data.

The analyses indicate that the green wave development (spring) can be readily detected in the Great Plains Corridor. Consequently, ERTS-1 data provide a new tool for monitoring "range readiness" on a regional basis. The onset of summer drought and its duration can also be monitored. Data from the ten G.P.C. sites suggest that the satellite coverage has been adequate to monitor the status of rangeland vegetation for regional management purposes.

#### DATA PRODUCT SUMMARY:

The ERTS-1 imagery and tape receipts and orders "quick-look" chart on the following two pages shows the status of ERTS-1 data inventory and retrospective data requests by the end of this reporting period.

"Turn-around" time for receipt of retrospective product orders has improved slightly during this reporting period.

#### SCHEDULED ACTIVITIES:

The following activities are scheduled for the next two month reporting period:

- a) Routine ground truth data collection at the ten G.P.C. sites will be continued and then terminated on July 1, 1974.
- b) A final ground truth data summary for all data collected will be prepared.
- c) As ERTS-1 MSS digital data products are ordered and received, they will be routinely processed for selected subsites using the masking technique.
- d) CAL-COMP plots for all processed ERTS data will be prepared for selected subsites.
- e) Densitometry of ground truth photographs and aerial photography for each of the test sites will be initiated.

ERTS-1 IMAGERY AND TAPE

RECEIPTS AND ORDERS

GREAT PLAINS CORRIDOR TEST SITES

CYCLE	DATES	COLLEGE STATION	SONORA	THROCKMORTON	WOODWARD	HAYS	SAND HILLS	COTTONWOOD	MANDAN	WEST LAKE	CHICKASHA
0	7/25/72 7/30										
1	8/1 - 8/17										
2	8/19 - 9/4										
3	9/6 - 9/22										
4	9/24 - 10/10										
5	10/12 - 10/28										
6	10/30 - 11/15										
7	11/17 - 12/3										
8	2/5 - 12/21										
9	12/23 - 1/8/73										
10	1/10 - 1/26										
11	1/28 - 2/13										
12	2/15 - 3/3										
13	3/5 - 3/21										
14	3/23 - 4/8										
15	4/11 - 4/26										
16	4/29 - 5/14										
17	5/17 - 6/2										
18	6/4 - 6/19										
19	6/22 - 7/7										
20	7/10 - 7/25										

ERTS-I IMAGERY AND TAPE  
RECEIPTS AND ORDERS

GREAT PLAINS CORRIDOR TEST SITES

CYCLE	DATES	COLLEGE STATION	SONORA	THROCKMORTON	WOODWARD	HAYS	SANDHILLS	COTTONWOOD	MANDAN	WESLAKE	CHICKSSA
21	7/28/73-8/12	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
22	8/15-8/30	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
23	9/2-9/17	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
24	9/20-10/4	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
25	10/8-10/22	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
26	10/26-11/10	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
27	11/13-11/27	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
28	12/1-12/15	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
29	12/19/73-1/3/74	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
30	1/6/74-1/21	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
31	1/24-2/8	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
32	2/11-2/26	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
33	3/1-3/16	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
34	3/19-4/3	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
35	4/6-4/21	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒

SYMBOLS:

- ☐ NO DATA PRODUCTS RECEIVED
- ☒ 9" B&W POSITIVE TRANSPARENCIES RECEIVED
- ☒ B&W PRODUCTS ORDERED (NOT RECEIVED)
- ☒ BULK PROCESSED DIGITAL TAPES ORDERED
- ☒ MAGNETIC TAPES RECEIVED
- ☒ NO FURTHER PRODUCT ORDER - ANTICIPATED
- ☒ BULK COLOR COMP. PRINT ORDERED
- ☒ BULK COLOR COMP. TR. ORDERED
- ☒ PRECISION COLOR COMP. ORDERED
- ☒ PRECISION COLOR COMP. TR. ORDERED

- f) Statistical analyses using selected subsite area data will be continued to determine the correlations between ERTS and test site data.

8

ERTS IMAGE DESCRIPTOR FORM  
(See Instructions on Back)

APPENDIX

DATE May 27, 1974  
PRINCIPAL INVESTIGATOR J. W. Rouse, Jr.  
GSFC U220  
ORGANIZATION Remote Sensing Center

NDPF USE ONLY  
D \_\_\_\_\_  
N \_\_\_\_\_  
ID \_\_\_\_\_

PRODUCT ID (INCLUDE BAND AND PRODUCT)	FREQUENTLY USED DESCRIPTORS*			DESCRIPTORS
	Rangeland	Pasture	Grassland	
1560-16264 4,6,7	X	X	X	Lake
1578-16262 4,5,6	X	X	X	Dormant Vegetation
1581-16433 M	X	X	X	Dormant Vegetation, Brush
1581-16424 M	X	X	X	River
1581-16415 M	X	X	X	River
1581-16410 M	X	X	X	Snow
1582-16464 M	X	X	X	Snow
1585-17024 M	X	X	X	Badlands
1621-17004 M	X	X	X	Heavy Snow, Frozen River
1578-16273 4,5,6	X	X	X	Gulf, Brush
1561-16333 4,6,7	X	X	X	Lake
1638-16555 M	X	X	X	Sand Hills, Badlands



\*FOR DESCRIPTORS WHICH WILL OCCUR FREQUENTLY, WRITE THE DESCRIPTOR TERMS IN THESE COLUMN HEADING SPACES NOW AND USE A CHECK (✓) MARK IN THE APPROPRIATE PRODUCT ID LINES. (FOR OTHER DESCRIPTORS, WRITE THE TERM UNDER THE DESCRIPTORS COLUMN).

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