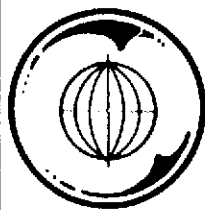


CR-136188



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 5

Period: September 28, 1973 to November 27, 1973

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 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 wide dissemination of Earth Resources Survey
Program information and without liability
for any use made thereof."

(E74-10143) MONITORING THE VERNAL
ADVANCEMENT AND RETROGRADATION (GREEN WAVE
EFFECT) OF NATURAL VEGETATION PROGRESS
Report, 28 Sep. - 27 Nov. 1973 (Texas
A&M Univ.) 12 p HC \$3.00
CSSL 08F
G3/13
UNCLAS
00143
N74-13069

ACCOMPLISHMENTS:

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

- a) Ground data summaries were updated to include the summer and autumn of 1973. Computer programs developed previously were used to prepare accumulative summaries of vegetation data obtained from the ten network test sites.
- b) Routine updating of ERTS-1 imagery and aerial photography logs has been accomplished.
- c) Intensive field sampling initiated in April, 1973 at the Throckmorton test site was continued in October.
- d) Three stages of large-scale color-IR and one scale of color ektachrome aerial photography were taken at Throckmorton in conjunction with the October ground data collection period and satellite overpass.
- e) Test site characterization has been emphasized during this reporting period and "masks" for overlaying soil and vegetation resource and land use information onto ERTS greymaps have been completed for seven of the ten test sites.

- f) Location information of masked areas has been coded and keypunched in preparation for routine extraction and analysis of ultimate subsite data for six of the test sites.
- g) Computer analyses of MSS digital data were continued during this reporting period for routinely located and extracted 7km X 7km areas including the test sites. Means, covariances, and the band ratio parameter, TVI (transformed vegetation index), have been calculated for these ERTS-1 data sets.
- h) Work has continued on the interpretation of statistical analysis of ground and ERTS-1 MSS data from G.P.C. test sites.
- i) Special data summaries and visual aids were prepared for the NASA review of the Great Plains Corridor project at NASA/GSFC.
- j) Image descriptors were assigned for ERTS-1 imagery containing good quality Great Plains Corridor network test site data not previously described (Appendix).

SUMMARY OF SIGNIFICANT FINDINGS:

Emphasis during this reporting period has been

given to an inventory of land resource types and land use at the ten Great Plains Corridor test sites. A resource and land use classification system was developed which uses available soil survey information and interpretations from NASA obtained high flight aerial photography to locate discrete areas of similar rangeland vegetation. Existing classification systems, even those developed for use with remote sensor data, were found to be inadequate for this project. This system is expected to be of general use for remote sensing related to land use and management. It has specific applicability to any effort aimed at regional use of ERTS-1 MSS digital data products.

A preliminary assessment of the relative importance of rangelands in the Great Plains Corridor states indicates that the value of the livestock industry supported by this resource exceeds 23 billion dollars. The development of a "Rangeland Feed Conditions" index for this region could be used by more than 400,000 farm and ranch operators involved in the production of more than 40% of the nation's beef and much of the country's grain.

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.

Three retrospective data requests were placed during the period covered by this report. These orders were sent on October 1, October 8, and October 26, 1973.

Standing order black-and-white products are being received from four to ten weeks following date of acquisition. The bulk of the images are received from seven to eight weeks following ERTS-1 acquisition. Receipt of color composite and digital data products has been varying from about eight to sixteen weeks following retrospective orders.

The quality of the color composite products produced by GSFC are generally much improved over those produced during the first few month's of operation. They are generally more interpretable due to better color balance and exposure.

SCHEDULED ACTIVITIES:

The following activities are scheduled for the next reporting period.

- a) Routine site location on ERTS-1 MSS
greymaps and analysis of data as set forth

in the Data Analysis Plan for the Great Plains Corridor investigation will be continued as data products are received.

- b) Resource and land use overlays for the G.P.C. sites will be completed by continuing to utilize photography on file in conjunction with field validation. CCT masks will be developed for all test sites.
- c) Mask location accuracy will be checked, and modifications in the masks will be made as necessary to achieve maximum efficiency in land resource and land use extraction.
- d) Ultimate subsite extraction and analyses of subsite MSS data will be completed for all data sets for which 7km X 7km processing has been completed.
- e) Ground data summaries will be updated to include all data acquired through December 31, 1973.
- f) Weather information for the 1972 and 1973 data collection periods will be compiled and summarized.
- g) Correlation of weather information with ground data and ERTS-1 MSS data will be

initiated and emphasis given to isolating covariant variables associated with ERTS-1 data products.

- h) Field sampling will be continued during the winter dormant season at the College Station and Throckmorton test sites when vegetation changes are anticipated or when weather conditions indicate good satellite data acquisition.
- i) Emphasis will be given to an analysis of the characteristics of the "transformed vegetation index" and the possibilities for using ERTS-1 MSS data for measuring vegetation conditions on rangelands.

ERTS IMAGE DESCRIPTOR FORM
(See Instructions on Back)

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DATE September 28, 1973

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
	Range- land	Pasture	Grass- land	
1361-16245	X	X	X	Clouds, Lakes
1362-16304	X	X	X	City, Forest
1346-16422	X	X	X	Brush, Clouds
1365-16475	X	X	X	Lake, Dormant Vegetation
1347-16480	X	X	X	Brush
1364-16420	X	X	X	Lake
1311-16482	X	X	X	Dormant Vegetation
1346-16413	X	X	X	Brush, Lakes
1357-16462	X	X	X	Cropland
1330-16513	X	X	X	Cropland, Fallow Fields
1348-16511	X	X	X	Lakes, Cropland
1347-16453	X	X	X	Irrigation, Clouds
1365-16452	X	X	X	Cropland, Dormant Vegetation
1368-17011	X	X	X	Dunes, River
1385-16551	X	X	X	Irrigation, Dunes

*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).

MAIL TO **NDPF USER SERVICES**
CODE 563
BLDG 23 ROOM E413
NASA GSFC
GREENBELT, MD. 20771
301-982-5406

ERTS IMAGE DESCRIPTOR FORM
(See Instructions on Back)

9

DATE September 28, 1973

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
	Range- land	Pasture	Grass- land	
1351-17064	X	X	X	Badlands
1296-17020	X	X	X	Cropland
1368-17011	X	X	X	Irrigation
1333-17070	X	X	X	Clouds, Badlands
1351-17055	X	X	X	Lake, Cropland, River
1369-17054	X	X	X	Clouds, River
1333-17061	X	X	X	Fallow Fields, Lake
1362-16315	X	X	X	Cropland, Lakes
1346-16410	X	X	X	Clouds, Dormant Vegetation, Lakes
1164-16310	X	X	X	Forest, Lake
1397-16242	X	X	X	Forest
1436-16395	X	X	X	Brush
1382-16410	X	X	X	Brush
1401-16453	X	X	X	Lake
1439-16541	X	X	X	Dunes
1436-16393	X	X	X	River

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ERTS IMAGE DESCRIPTOR FORM

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DATE September 28, 1973

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
	Range- land	Pasture	Grass- land	
1439-16543	X	X	X	Dunes
1403-16545	X	X	X	Dunes, Irrigation
1405-17060	X	X	X	Badlands
1422-17001	X	X	X	Badlands
1387-17061	X	X	X	Badlands
1386-17010	X	X	X	Badlands
1402-16503	X	X	X	Cropland
1400-16402	X	X	X	River
1401-16444	X	X	X	Cropland
1383-16455	X	X	X	River
1383-16450	X	X	X	Cropland

*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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 NASA GSFC
 GREENBELT, MD. 20771
 301-982-5406

ERTS-1 IMAGERY AND TAPE

RECEIPTS AND ORDERS

GREAT PLAINS CORRIDOR TEST SITES

CYCLE	DATES	COLLEGE STATION	SONORA	THROCKMORTON	WOODWARD	HAYS	SANDHILLS	COTTONWOOD	MANDAN	WESLACO	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	12/5 - 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	WESLACO	CHICKASHA
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	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒

SYMBOLS:

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