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EVALUATION OF ERTS-1 IMAGERY IN MAPPING AND MANAGING
SOIL AND RANGE RESOURCES IN THE SAND HILLS REGION OF
NEBRASKA

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16. Abstract Ground truth collection involving field measurements of vegetative biomass on specific range sites in the north-central portion of the Sand Hills region was continued. Computer programs are being developed and modified to use radiance values obtained from CCT's in measuring vegetative biomass on known range sites. Construction of a soil association map for the entire Sand Hills region is in progress using 1:250,000 enlargements of snow-enhanced ERTS-1 imagery. Cooperation with the Great Plains corridor project administered by Texas A&M University is being continued.			
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Figure 2. Technical Report Standard Title Page

Preface

This report covers the period January 1, 1974 to June 30, 1974 for the investigation evaluating the use of ERTS-1 imagery in mapping and managing soil and range resources in the Sand Hills region of Nebraska (MMC 020, James V. Drew, Principal Investigator, GSFC Identification Number UN-062, NASA Contract Number NAS5-21756).

Collection of ground truth for range sites in the Valentine area within the north-central portion of the Sand Hills region is being continued. Forage density data from 1 square meter plots and ground photos in color are taken, concurrent with each satellite overpass.

Initial stages of computer manipulation of data are being examined. A computer compatible tape, obtained by retrospective order, has been placed in the University of Nebraska's IBM 360 computer and programs are being modified to produce data in the required form for forage density evaluations.

Initial stages of development of a soil association map for the entire Sandhills region have been completed. Attempts to delineate the associations at a scale of 1:500,000 did not allow for adequate detail to be seen for smaller areas. County areas at a scale of 1:125,000 will be delineated, combined and reduced for a region-wide map.

Cooperation with the Texas A & M Great Plains Corridor project (MMC 667) was extended to July 1, 1974. Forage density measurements, field observations and climatological data were provided for the period.

Introduction

This report describes data evaluation and ground truth collection during the period January 1, 1974 to June 30, 1974 for contract NAS5-21756. Areas of activity include (1) collection of ground truth, (2) familiarization with computer manipulation of data, (3) soil association maps for Sandhills region, (4) cooperation with Texas A & M Great Plains Corridor project, and (5) preparation of final report.

Ground Truth Collection

Collection of ground truth from study sites in Cherry County, Nebraska was continued. Clipping data from one square meter plots were taken. Fresh weights, dry weights, utilization and ground photographs were taken for each sampling period. Additional observations and color photographs are taken for selected features and areas of the region for general interpretation. A severe lack of rainfall in some areas has substantially reduced forage production. Close monitoring of these areas will be necessary to attempt to prevent serious wind erosion problems.

Computer Manipulation of Data

One set of computer compatible tapes, retrospectively ordered, has been used to initiate computer manipulation of ERTS-1 data. Programs provided by Dr. Jane Schubert, NASA, GSFC, are being modified to provide the most usable data output for our purposes. Precision location of data points for geographic coordinates has been most difficult to achieve. Radiance value clustering and manipulation of band ratios appear to provide meaningful data with reference to forage density evaluation.

Regional Soil Association Map

Previous development of soil association mapping techniques using summer imagery for vegetative interpretations and winter imagery with snow cover and low sun angle has permitted construction of a soil association map for the entire Sandhills region. Since soils maps made by conventional techniques do not exist for a large portion of the region, this association map will provide a uniform basis for soil resource interpretations across the region. It will also provide information for those areas where no recent survey exists.

Attempts to map associations on 1:500,000 enlargements of ERTS-1 imagery revealed difficulties in distinguishing sufficient ground detail, particularly on the winter scenes. The more subtle changes in topography were more apparent on enlargements of 1:125,000 and these enlargements are being used to construct a soil association map for the entire Sand Hills region.

Cooperation with Texas A & M

Contact with Texas A & M Great Plains corridor project (MMC667) personnel indicated a need for data until July 1, 1974. Standardized data collection procedures were carried out for the Great Plains corridor project until the satellite overpass of July 7, 1974. Forage density in the form of clipping data from one square meter plots was provided for each satellite pass beginning May 9, 1974. Additional field observations concerning vegetative stages of growth, grazing utilization and color photographs were also provided. Climatological data from the nearest reporting station was gathered and forwarded.

Final Report

Preparation of a final report for this project has been initiated.

Program For Next Reporting Period

The program for the next six months will involve a continuation of current activities. Acquisition of ground truth involving vegetative biomass will continue. Clipping data, ground photographs and other observations will be collected for selected areas.

A region wide soil association map will be constructed based on visual interpretations of 1:250,000 enlargements of ERTS-1 imagery. The individual areas will then be combined to produce a regional map at a larger scale.

Manipulation of computer data for estimates of vegetative biomass will be continued. It is anticipated that range site categories as well as forage density maps can be produced with proper radiance clustering and ratio analyses.

Conclusions

It is feasible to produce a soil association map of the entire Sand Hills region utilizing spring imagery for vegetative interpretations and winter imagery with snow cover and low sun angle for topographic interpretations.

It appears likely that forage density and range site category maps can be generated for the sandhills region from computer compatible tapes by radiance values clustering and band ratio manipulation. Production of this type of data by computer presents the possibility of real time range evaluation, which is essential if ranchers and range managers are to effectively use ERTS data for management decisions.

Recommendations

No recommendations are being offered at this time.

Publications

Seevers, Paul M. 1974 Forage density estimation and soil association mapping in the Sandhills of Nebraska from remote sensing data. Proceedings of the Nebraska Academy of Sciences, Lincoln, Nebraska p. 35.

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DATE June 30, 1974

PRINCIPAL INVESTIGATOR J. V. Drew

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1566-16571-7		X		
1562-16350-5	X			
1582-16453-M	X			
1600-16451-6	X			
1600-16451-7	X			
1600-16453-6	X			
1600-16453-7	X			
1600-16460-7	X			
1599-16393-M	X			
1599-16395-4	X			
1599-16395-6	X			
1599-16395-7	X			
1586-17082-M		X		
1586-17084-M		X		
1586-17091-M	X			
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1598-16334-M	X			
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1604-17080-M		X		
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1634-16335-7	X			
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1633-16274-M	X			
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1637-16503-7			X	
1637-16510-6	X			
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1615-16283-M				
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1584-16565-M		X		
1583-16511-M	X			
1583-16520-M	X			
1582-16455-M	X			
1582-16462-M	X			
1581-10394-M	X			
1581-16401-M	X			Snow cover
1581-16403-M	X			Snow cover
1561-16292-M	X			
1564-16461-7	X			
1564-16463-7	X			
1564-16454-7	X			

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1562-16350-6	X			
1562-16350-7	X			
1579-16282-M	X			
1579-16284-M	X			
1579-16291-M	X			
1635-16393-7				

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