

FORESTRY APPLICATIONS (PARALLEL SESSION)

A COOPERATIVE FORESTRY INVENTORY PROJECT FOR NEVADA

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The Division of Forestry considers the use of Landsat data for forest inventory projects, a reliable and low cost method which can produce accurate resource data. Landsat data is good by itself for many purposes, but its real value becomes apparent when linked to a Geographical Information System (GIS). A GIS system will link ownership, existing county planning maps, zoning maps, slope, elevation and aspect data together, thus providing the user with a wide variety of inter-related information sources to improve his own. For this project, the Division just touched a few possibilities concerning the combination of a GIS and Landsat inventory with results that were very positive.

The Division considers the training and constant cooperation of the Ames Research Center a vital part of this project. The many hours devoted to the project by a number of ACR personnel added greatly to the high quality results of the effort.

The area chosen for the demonstration project was a very difficult area due to the vast difference in vegetation types of both Douglas County and Carson City. To decrease the amount of misclassification for county-wide projects, the area was divided into three separate ecozones. These three ecozones were then classified after digitizing boundary lines between all three. Ownership data was produced and vegetation classes were tabulated per ownership. Desert vegetation may be easier to classify using the remote sensing techniques of Landsat due to the similarity of brush species, forest types, agricultural areas and riparian vegetation.

The final products of the demonstration project has created much interest among state/federal resource agencies in Nevada. Many agencies can see the potential value of such data for their own purposes. The forest harvestibility map, big game habitat map, fire hazard map, plus the land cover map are all types of useable information sources for planners and resource managers.

Future Outlook

Through the efforts of the Governor's Planning Coordinators Office, Division of Forestry and Division of State Lands, a resource group has

has been formed to study the possibility of a new project covering several million acres. Each participating resource agency will assist with their particular data needs for the project. Most of the processing will be handled by the States IBM 360 - VICAR/IBIS software.

The Division of Forestry can foresee the potential use of such resource information being a real value to all planning departments and agencies. It is a low cost alternative which can be updated periodically and has the capability of using all existing data sources as overlays to Landsat base data.

The program has been a benefit for the Division and other agencies cooperating in this initial demonstration project.

Introduction

This pilot forest inventory project describes a use of computerized classification of Landsat data to inventory vegetative types in western Nevada. The pilot study was a cooperative effort between the Department of Conservation & Natural Resources (Division of Forestry & Division of State Lands), the University of Nevada, Reno, and the National Aeronautics & Space Administration (Ames Research Center), during May 1979 through August 1980.

From 1975 through 1980, a growing demand generated by state resource agencies to evaluate and monitor the natural resources under their jurisdiction, a joint project was initiated between the State of Nevada and Ames Research Center (NASA). Through the efforts of the University of Nevada, Reno, Renewable Natural Resources Department, a meeting was held which introduced many state agencies to Landsat computerized data for various resource related projects.

The State of Nevada is in a unique position compared to most other states in the Nation. Approximately 60.8 million acres, 86.3% of Nevada, is under direct management of the federal government. Currently, the management policies and practices concerning this vast resource area are strictly federally controlled with some input by various state resource agencies. Many state resource agencies are interested in acquiring needed resource information concerning Nevada. Through the use of Landsat computerized imagery, the Department of Conservation and Natural Resources hoped to map forest densities of timber types in Carson City (County) and Douglas County, Nevada. The agencies involved are the University of Nevada, Renewable Natural Resource Department.

Accurate and timely resource information is necessary in making the best possible decision concerning Nevada's resources. The possibility of using digital computerized information is one alternative solution. One basic reason for this required information was created through the "Sagebrush Rebellion" issue. The "Sagebrush Rebellion" is actually the nickname of the law effected by the Nevada Legislature 1 July 1979. Essentially, this law lays claim to "unappropriated, vacant and unreserved" lands in Nevada owned by the United States government. These federal lands, primarily administered by the Bureau of Land Management (BLM), comprise a majority of the entire State of Nevada.

Landsat Remote Sensing

The Division of Forestry is interested in demonstrating the feasibility of technologically advanced inventory methods. They are especially interested in the potential benefits of remote sensing for inventorying Pinyon-Juniper forest types. Remote sensing may be generally defined as the observation of objects or scenes without direct contact. Aerial photography has long been used in forest management planning and represents proven remote sensing technology. The Division of Forestry is especially interested in the NASA satellite series, Landsat, as a potential provider of resource inventory information.

Landsat satellite views the earth as a grid network of 1.1 acre data cells (pixels) and therefore, does not see individual trees as with the traditional aerial photographs. In contrast to color aerial photography, Landsat records only two of the colors recorded by color film, red and green. Furthermore, it records two bands of reflected infrared radiation which color film is not sensitive. Landsat data is digital (a series of numbers rather than tones or colors on a photograph), and therefore can be processed by computers. This numerical aspect of the data is the most interesting to the resource agencies.