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DIGITAL ANALYSIS OF HUMAN IMPACT
ON TROPICAL VEGETATION

Suzanne Textor
Department of Geography
Columbia University
New York, New York 10027

Jerry C. Coiner
Goddard Institute for Space Studies
New York, New York 10027

FOREST TYPE MAPPING USING COMPUTER
CLASSIFICATION OF LANDSAT DATA

Emily Bryant
Goddard Institute for Space Studies
New York, New York

Arthur G. Dodge, Jr.
University of N.H.
Durham, NH

ABSTRACT

The purpose of these studies was to develop digital-processing techniques for LANDSAT Multispectral Scanner (MSS) data to use in monitoring the effect of human activity upon Amazonian vegetation. The procedure involves: (1) development of signatures for major vegetation communities, and (2) measurement of the extent of vegetation modification by human groups.

Study sites were located in lowland Peru and in the Amazon basin of Brazil, south of Manaus, where tropical ombrophilous forest is the dominant natural vegetation. Two groups are currently modifying the natural vegetation: native Indiana populations and representatives of the "modern" national economies. The mode of occupance of these two groups differs significantly. Indiana groups, who have traditionally shifted village location every few years, occupy scattered sites of limited areal extent. While the influence of representatives of the modern economy is more recent, it threatens to be far more disruptive and widespread.

The methodology employed relies upon the use of GISS algorithms to develop signatures for major components of the Amazonian landscape. Even though the area covered by each Indiana village is small (approximately five hectares), it was possible to develop signatures because spectral character shifts radically when tree cover is removed for settlement. Search for previously unknown sites was concentrated in the ecological zone favored by traditional groups.

ABSTRACT

Computer classification of LANDSAT data from July 24, 1973 has resulted in measurements and maps of forest types for two New Hampshire counties. Signatures were developed from training sites and applied to test areas and then to the counties. Acreages of hardwood and softwood type and total forested area derived through this process compare favorably with Forest Service statistics for the same areas. Computer generated maps located hardwood, softwood and mixed wood types accurately when compared with low level aerial photography. Additional measurements made using data from August 29, 1973 and September 21, 1972 for one of the counties are reasonably consistent with those from July, 1973 data. Our techniques have such advantages as low cost and objectivity, making them particularly applicable in states having forest taxation laws based on general productivity.