MONITORING THE MESOAMERICAN BIOLOGICAL CORRIDOR: A NASA/CCAD COOPERATIVE RESEARCH PROJECT (NAG5-8712 University of Maine)

Final Report Submitted to NASA-ESE by

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Abstract

To foster scientific cooperation under a Memorandum of Understanding between NASA and the Central American countries, the research project developed regional databases to monitor forest condition and environmental change throughout the region. Of particular interest is the Mesoamerican Biological Corridor (MBC), a chain of protected areas and proposed conservation areas that will link segments of natural habitats in Central America from the borders of northern Columbia to southern Mexico. The first and second year of the project focused on the development of regional satellite databases (JERS-1C, MODIS, and Landsat-TM), training of Central American cooperators and forest cover and change analysis. The three regional satellite mosaics were developed and distributed on CD-ROM to cooperators and regional outlets. Four regional remote sensing training courses were conducted in 3 countries including participants from all 7 Central American countries and Mexico. In year 3, regional forest change assessment in reference to Mesoamerican Biological Corridor was completed and land cover maps (from Landsat TM) were developed for 7 Landsat scenes and accuracy assessed. These maps are being used to support validation of MODIS forest/non forest maps and to examine forest fragmentation and forest cover change in selected study sites. A no-cost time extension (2003-2004) allowed the completion of an M.S. thesis by a Costa Rican student and preparation of manuscripts for future submission to peer-reviewed outlets. Proposals initiated at the end of the project have generated external funding from the U.S. Forest Service (to U. Maine), NASA-ESSF (Oregon State U.) and from USAID and EPA (to NASA-MSFC-GHCC) to test MODIS capabilities to detect forest change; conduct literature review on biomass estimation and carbon stocks and develop a regional remote sensing monitoring center in Central America. The success of the project has led to continued cooperation between NASA, other federal agencies, and scientists from all seven Central American Countries (see SERVIR web site for this ongoing work – servir.nsstc.nasa.gov).

Keywords:
Research Fields- deforestation, land cover classification, habitat fragmentation
Geographic Area/Biome- Central America, humid tropical forest
Remote Sensing- Landsat, SAR, MODIS
Methods/Scales- data fusion, integrated assessments, regional scale
Scientific Question Addressed: What are the changes in land cover/land use? (forest monitoring and mapping)
Proportion of Social Science: 0
GOFC Forest Themes: Map/monitor-50%, change-25%, other (training)-25%
Goals: Develop regional satellite databases for Central America to map and monitor
forest cover, forest fragmentation and change along the Mesoamerican Biological Corridor. Develop research partnerships with Central American scientists and cooperators.

Accomplishments:

- Four training/workshops conducted in Central America
- JERS, MODIS, and Landsat-TM regional mosaics available for the first time for Central America
- Preliminary analysis of forest cover and change indicate that forest cover was higher, forest change is lower inside the corridor units than outside. Forest clearing rates appear to be lower (based on 26% sample) than 1980 rates reported by FAO.
- Regional land cover and accuracy assessed database (7 Landsat scenes)
- Publications and other research products (see attached list)

New Findings – nothing to report this period

New Potential - nothing to report this period

Products

1. JERS-1C mosaic (late 1996) at 100m rectified to 3 arc-second DEM for Central American region.
2. MODIS mosaic (2001) at 250m for Central American region.
3. Landsat-TM mosaic (late 1980's to early 1990's). Note that this comes from the NASA Scientific Purchase Databuy (EarthSat) database but we produced the mosaic (TM 3,4,5) at 250m rectified to the DEM.

List of Publications and Presentations

*Book Chapter - In Press:*


*Published Article-Refereed*

Conference Papers and Abstracts – Published


Technical Reports


Presentations


Sader, S.A. Monitoring forest cover and change in Central America with special reference to the Mesoamerican Biological Corridor. NASA Land Cover/Land Use Change Science Team Annual Meeting, Nov. 12, 2002, University of Maryland- College Park. Invited Poster Presentation.


Thesis


Manuscripts in Preparation:
