Field Measurements for the Training and Validation of Burn Severity Maps From Spaceborne, Remotely Sensed Imagery. 01B-2-1-01. Thomas Bobbe and Mark V. Finco.

Problem: In addition to the resources lost during a wildland fire, the loss of vegetation and high temperatures damage soils, thus increasing runoff and endangering structures, watersheds and soils. Burned Area Emergency Response (BAER) teams are called upon to stabilize soils, reduce downstream threats, and protect other resources. One of the first products BAER teams need to produce is an accurate map of the burn severity. Burn severity is indicative of the degree of impact to soil properties and is used to prioritize treatments for protecting resources at risk. Field surveys and low elevation sketch mapping have been the standard for developing severity maps but have several limitations, especially on large fires, such as; costs, vendor availability, size of image files, and biases associated with manual sketching and interpretation.

Approach: The project collected field data to refine and validate image classification methods previously developed for a variety of satellite imagery, including; Landsat 5 and 7, SPOT, ASTER, and MODIS. Burned Area Reflective Classifications (BARC) were used as a means of deriving burn severity from remote imagery. The BARC maps were used to stratify the burned area and over 200 field validation points were collected from seven different incidents during the 2002 fire season. Single scene and multi-date BARC image classification methods were investigated and two methods of accuracy assessment were performed.

Project Findings: Based on field observations and BARC classification, overall accuracies between 50% and 60% were achieved. Accuracies were typically highest for high severity and unburned areas (66%-83%), and lowest accuracies were in the low burn severity class. The overall accuracy of the single scene classification method was slightly higher than the multi-date method. Both single scene and mulit-date BARC maps were accurate enough to expedite the BAER teams production of final burn severity maps.

Deliverables and Technology Transfer: The project team worked with the various BAER teams associated with each of the incidents. As planned, the team held a workshop in December 2002 with remote sensing analysts, researchers, BAER team leaders and regional coordinators. A second technical session was held in November 2003 at the International Wildland Fire Ecology and Fire Management Congress. Eight technical papers were presented at the session. The JFSP web site has a brief description of this project.

References:
Final report is available online at: http://www.fs.fed.us/eng/rsac/baer/final_report_01B-2-1-01.pdf.

An outline of the project is located online at:
http://jfsp.nifc.gov/JFSP_Project_Info_6.htm.