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Monitoring Trends in Burn Severity: Overview and Current Mapping Status

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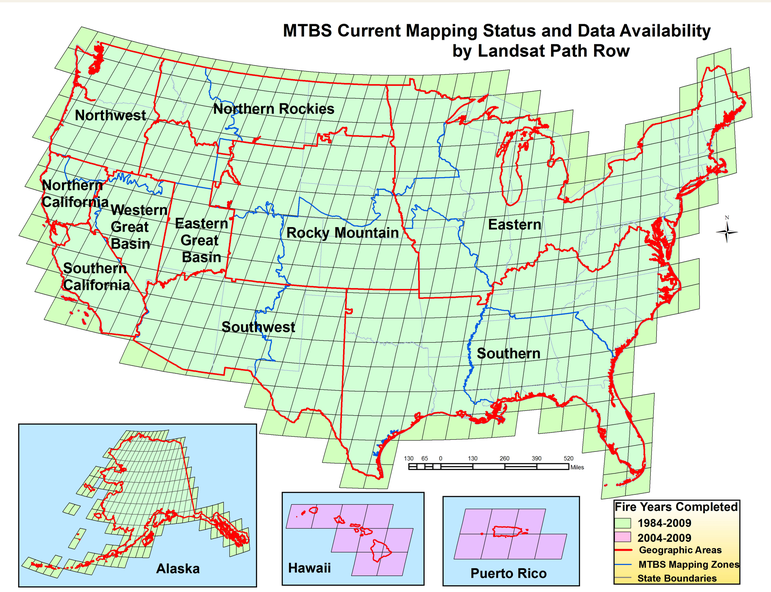
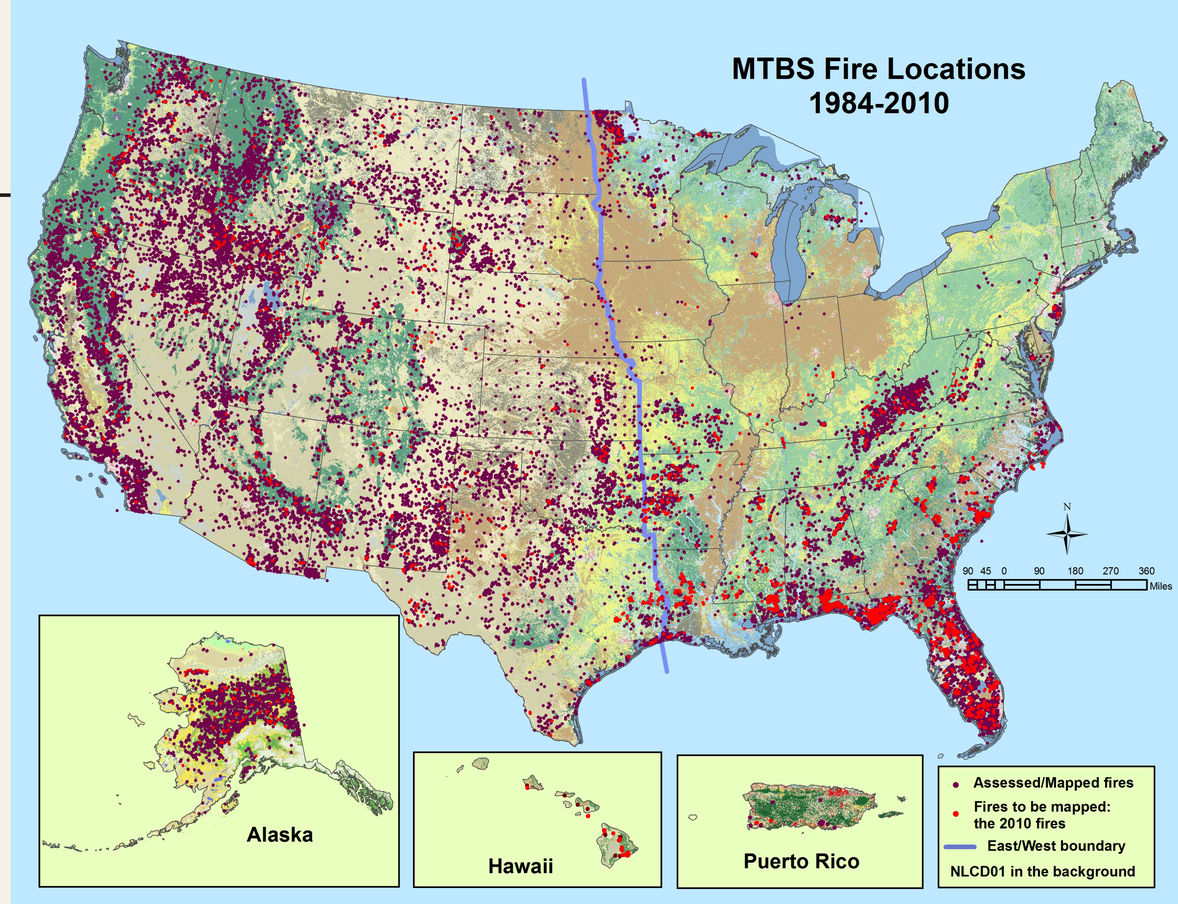
Background

The Monitoring Trends in Burn Severity project (MTBS) is sponsored by the Wildland Fire Leadership Council (WFLC). The fundamental requirement of the MTBS project is to create nationally consistent burn severity assessments of all large fires that have occurred in the United States since 1984. Beginning in 2006, the U.S. Geological Survey (USGS) Earth Resources Observation and Science (EROS) Center and the USDA Forest Service Remote Sensing Applications Center (RSAC) have collaborated to map these fires. The MTBS project uses Landsat imagery and the differenced Normalized Burn Ratio (dNBR) algorithm to assess the burn severity of each fire. The project maps fires across all administrative ownerships and defines "large fires" to be greater than 500 acres in the eastern U.S. and greater than 1,000 acres in the western U.S.

Overview and Current Mapping Status

During 1984 through 2009, 35,000 fire records were assessed and 13,619 fires were subsequently mapped. Currently, RSAC is mapping the 2010 fires and USGS EROS is mapping discovered fires (fires not reported in the FOD) in the conterminous United States. Fires that have been completed are available for download at http://mtbs.gov.





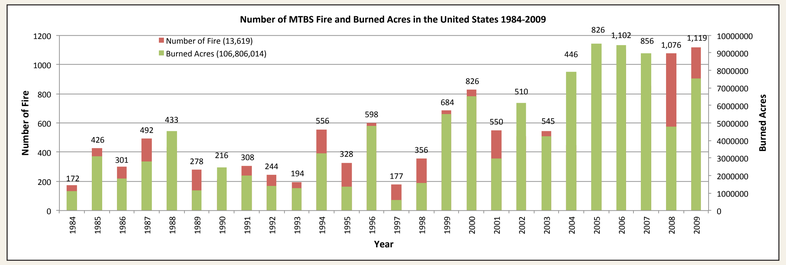
(The MTBS project collected fire locations across the United States from multiple federal and state agencies including the USDA Forest Service, Department of the Interior (National Park Service, Bureau of Land Management, Bureau of Indian Affairs, and Fish and Wildlife Service), and individual states. All fire records were compiled, and fires that met MTBS size criteria were extracted to the Fire Occurrence Database (FOD). Using geographic and ancillary data from the FOD, MTBS analysts searched the Landsat image archive for appropriate imagery to map each fire. The FOD is available for download at http://mtbs.gov/dataaccess.html.)

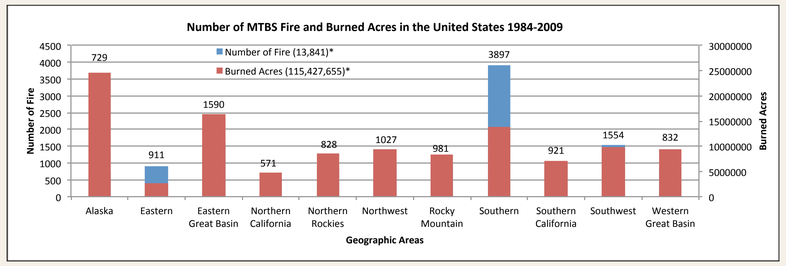
MTBS Burn Severity Assessment: Warm Fire 2006, Kaibab National Forest, Arizona

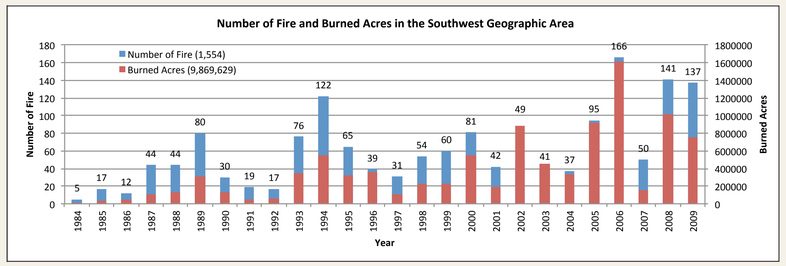
The MTBS project utilizes remotely sensed data from the Landsat 5 Thematic Mapper (TM) and Landsat 7 Enhanced Thematic Mapper Plus (ETM+) sensors. These data are orthorectified and calibrated to at-sensor reflectance for prefire and postfire images. To take advantages of Landsat's sensitivities to changes in soil (Band 7) and vegetation (band 4), the Normalized Burn Ratio {NBR = (Band 4 – Band 7)/(Band 4+ Band 7)} is calculated for prefire and postfire images. Differences between prefire and postfire images, which reflect between-image changes resulting from fire, are calculated by the differenced Normalized Burn Ratio (dNBR = pre_NBR-post_NBR) (dNBR, Key and Benson 2006, http://www.fire.org/firemon). The severity of the burn is related to the amount of change on the ground and vegetation loss that can be detected in the dNBR image. Five-class thematic burn severity maps are subsequently created by MTBS analysts by determining the appropriate burn severity image breakpoints by utilizing visual differences in image intensity and ancillary data.

Geospatial Data and Statistics on Burn Severity for the MTBS Fires in the United States 1984-2009

Geospatial data and summary statistics on burn severity are available for all mapped fires at http://mtbs.gov/dataaccess.html. User defined selection criteria allow users to query single or multiple fires by providing information such as fire ignition date, fire size, or administrative ownerships. GIS-derived geospatial data and other MTBS products including prefire and postfire subset imagery, fire perimeter, NBR, dNBR, thematic burned severity map, and metadata can be acquired for each fire. Large composite datasets such as mosaic of fire perimeters, fire location dataset, and burn severity images are also available for download.







** The total number of fires and burned acres reported differs by Geographic Area Coordination Centers (GACC) because fires overlap multiple GACC regions and are subsequently counted multiple times.*