Carbon Emissions from North American Wildland Fires:
Development of the Wildland Fire Emissions Information System (WFEIS)

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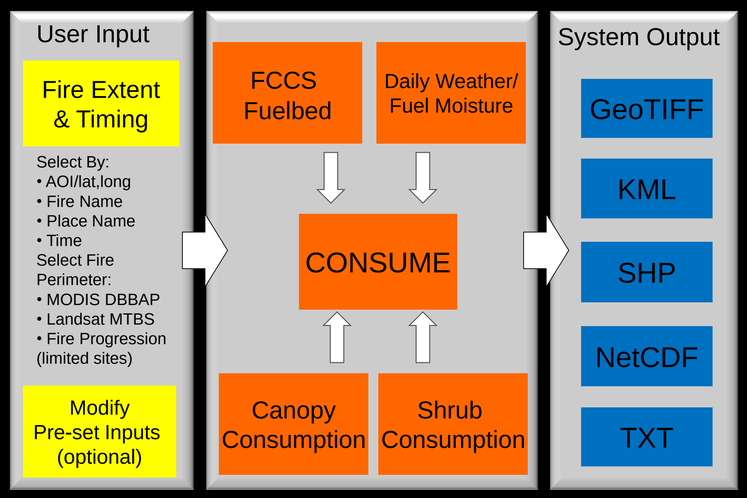
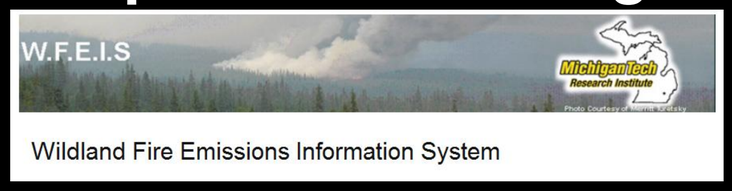
The Wildland Fire Emissions Information System is a web-based tool that provides a simple user interface for computing wildland fire emissions across North America at landscape to regional scales (1-km spatial resolution). WFEIS provides access to fire perimeter maps along with corresponding fuel loading data layers and fuel consumption models to compute wildland fire fuel consumption and fire emissions for specified locations and date ranges. The system currently allows calculation of emissions from fires within US 1982 to 2009.

WFEIS Overview



http://wfeis.mtri.org/



WFEIS is a flexible, open source, web-based system to estimate carbon emissions from fire across North America

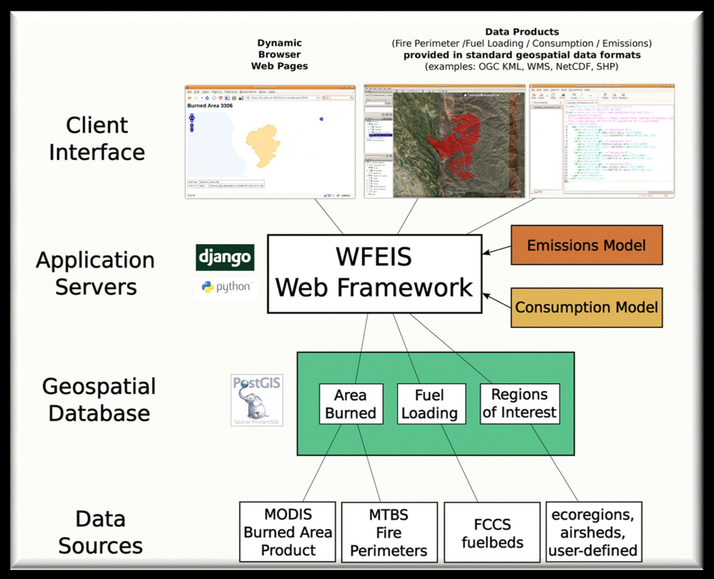
-- Provides information at moderate spatial scales and for multiple timeframes for landscape to regional applications;

-- Allows a choice of fire perimeter map for quantification of burn area;

-- Only required user input is location and time of interest;

-- Allows a variety of spatial and tabular outputs.

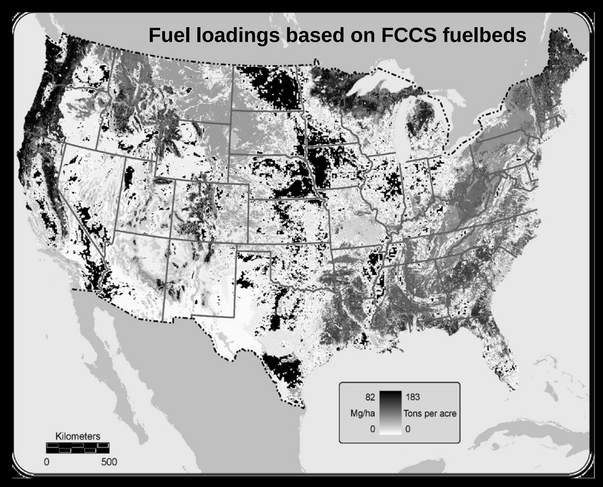
WFEIS Design & Development



Fuel Loading: *Fuel Characteristic Classification System (FCCS)*

The Fuel Characteristic Classification System

was developed by the US Forest Service and provides a comprehensive description of fuelbeds. Fuelbed characteristics are compiled from scientific literature, fuel photo series, fuel-inventory databases, and expert opinion, and calculated from allometric equations. Although FCCS fuelbeds can represent multiple scales, they were mapped at 1km for this continental-scale application. Fire-behavior equations in the FCCS calculate surface, crown, and available-fuel fire potentials, reaction intensity, flame length and rate of spread for each fuelbed.
http://www.fs.fed.us/pnw/fera/fccs/



Stratum		Category
Canopy		Trees, snags, ladder fuels
Shrubs		Primary and secondary layers
Nonwoody vegetation		Primary and secondary layers
Woody fuels		Sound wood, rotten wood, stumps, and woody fuel accumulations
Litter-lichen-moss		Litter, lichen, and moss layers
Ground fuels		Duff, basal accumulations, and squirrel middens

Built with open-source technology

-- GeoDjango: Web framework

-- GDAL / OGR: Raster / vector manipulation libraries

-- Proj4: Projection library

-- PostGIS: Geospatial relational client-server database

-- Python: Scripting language for integrating components

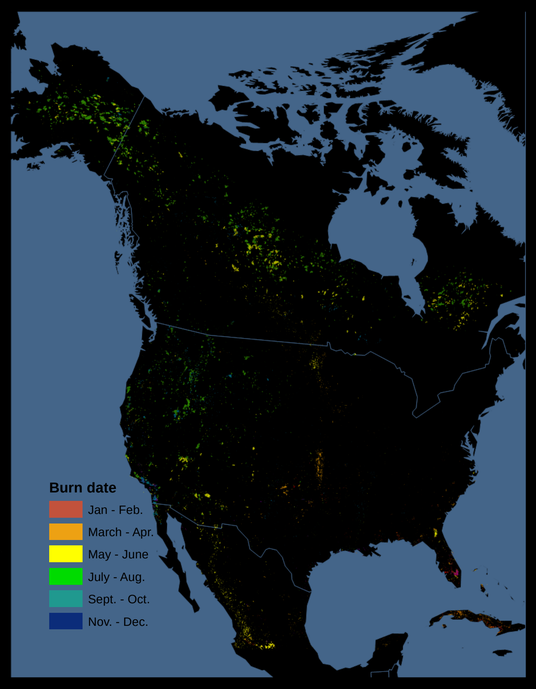
-- Ubuntu: Linux operating system distribution

Burned Area Products: *MODIS DBBAP, Landsat MTBS*

Burned Area Products available within WFEIS:

-- MODIS DBBAP *(Giglio, L. et al. 2009 Rem. Sens. Environ., 113(2), 408-420)*

-- Landsat MTBS *(http://mtbs.gov/)*



MODIS Direct Broadcast Burned Area Product (DBBAP)

2000-2009

Fuel Consumption and Emissions Factors: *Consume*

Consume is a US Forest Service model which estimates fuel consumption and emissions for prescribed and wildland fire. It imports fuelbed data directly from the FCCS. Consume can be used for all forest, shrub, and grassland types in North America.
http://www.fs.fed.us/pnw/fera/research/smoke/consume/

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