Topic & Title of Incident

Use of LANDFIRE Data in Wildland Fire Risk Assessment: Ashley Lakes Fire

Date of Incident

September 2006

Background

A fire weather and fire behavior long-term risk assessment was developed for the Ashley Lakes Fire in the Mission Mountain Tribal Wilderness on the Flathead Indian Reservation (Montana) in September of 2006. The fire was managed by the fire management staff of the Confederated Salish and Kootenai Tribes with assistance from other federal, state, and local fire personnel, including the National Oceanic Atmospheric Administration (NOAA) and National Weather Service (NWS) for short- and long-term weather forecasting and the Missoula Fire Sciences Laboratory – U.S. Forest Service for assistance with LANDFIRE data. Model outputs are used to assist managers in developing strategies for managing fires.

Key Points

Description of analysis

The assessment focused on the relative risk of a fire reaching identified values (such as a structure or valuable resource) for various time periods. Fire simulation models such as FARSITE (fire growth simulation model) and FlamMap (fire behavior mapping model that computes potential fire behavior characteristics) help in projecting where the fire is likely to move. These models require landscape information such as fuels and topography spatial data.

Until LANDFIRE data were available, local acquisition of data and conversion to a useable format proved time consuming and complicated. Moreover, in many cases, local data do not exist, requiring additional time to develop a coarse data set. Without the LANDFIRE data, fire spread projections would have been calculated by hand on a topographic map. Such manual projections forecasting beyond a day or two can be time consuming and result in less accurate fire behavior predictions for use by fire managers.

Since the summer of 2006, the USFS Remote Sensing Applications Center (RSAC) has, through an agreement with the LANDFIRE Project, transferred LANDFIRE data onto DVDs with an easy-to-use template that allows for quick conversion of data layer files into the format used in the FARSITE and FlamMap models.

Input data can be adjusted

The landscape data layers are used in FARSITE to create a landscape file, which is the basis for all fire projections and assessments that are performed in FARSITE and FlamMap. Additionally, some data within certain layers, such as fuels, can be easily changed in the landscape file within FARSITE. For example, on the Ashley Lakes Fire, the FARSITE model using LANDFIRE data projected fire spread high in the Mission Mountains; however, local knowledge and aerial observations confirmed a lack of fire spread in such sparse fuels. The fuel model within FARSITE was adjusted and subsequent simulations were more representative of actual fire spread rates.

Data to facilitate long-term strategic planning and support tactical plans

Using LANDFIRE data as input, FARSITE produced a visual reinforcement of fire managers' concerns over the potential downhill movement of the Ashley Lakes fire towards structures and other values at risk within a two week time period. Suppression resources were deployed to prepare fire lines for holding actions in advance of the fire reaching designated critical areas. After rainfall had slowed the spread of the Ashley Lakes fire in late September, adjustments were made to the FARSITE weather inputs, simulating an extended drying period in the first week of October (see figure A below). The outputs revealed that, even under worst-case conditions, the fire would not make significant movement towards new critical sites. This information helped fire managers make long-term strategic and tactical plans, such as delaying additional planned holding operations.

Faster decision-making capabilities with better data

The use of LANDFIRE data allowed for faster decision-making information that covered a larger area. Fire managers can make quick decisions on fast moving, high risk emergency events with greater confidence using this spatial data. In addition, the visual outputs in maps and reports help fire managers convey the message to affected landowners and the public.

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Key Points, continued...

Results / summary LANDFIRE data that is readily accessible and reasonably accurate allows for real-time analysis and assessments of risk from active fires. FARSITE enables the user to simulate fire behavior on the modeled landscape and make adjustments to the data when errors or inaccuracies are identified to calibrate the computer model with observed fire behavior. This ability results in more accurate risk assessments, which are needed by superintendents and other line officers when making critical decisions for fire operations and management teams.

Recommendations

Users should carefully assess the modeled data Modeled data must be assessed carefully to ensure that outputs accurately reflect actual conditions. The process of simulating fire spread using LANDFIRE data allows local fire managers to assess modeled outputs and recommend adjustments to help the long-term fire behavior analyst calibrate the data inputs used in the FARSITE model.

Timely data updates needed Data quality is the underlying factor determining the effectiveness of models in simulating fire spread and assessing risk. Poor or inaccurate data may lead to poor decision making. As a result, fire professionals may disbelieve the outputs and stop using the data. A system that allows for timely updates of the LANDFIRE data set will help preserve its usefulness and appeal to the fire community.

Wildland fire projection maps using two simulation models on the Flathead Indian Reservation.

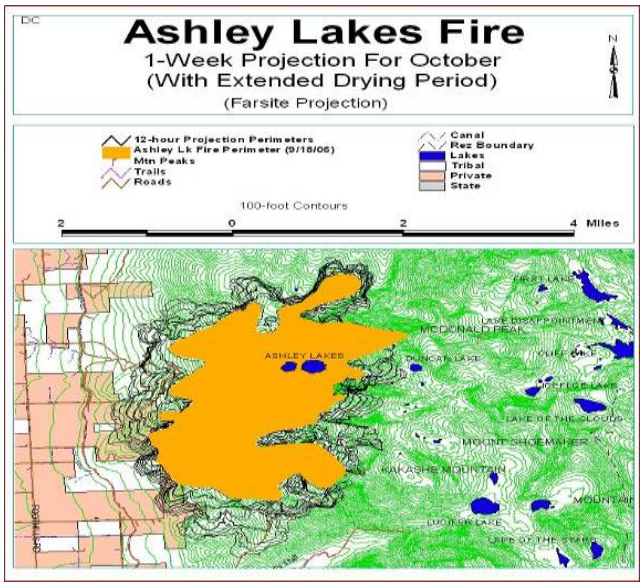

Figure A *- Fire perimeter in orange surrounded by projected fire perimeters (FARSITE model analysis) in black. After rainfall had slowed the spread of the Ashley Lakes fire in late September, adjustments were made to the FARSITE weather inputs, simulating an extended drying period in the first week of October. The figure shows that even with weather projected to be hotter and dryer, the fire would not grow significantly and threaten sites of concern.*

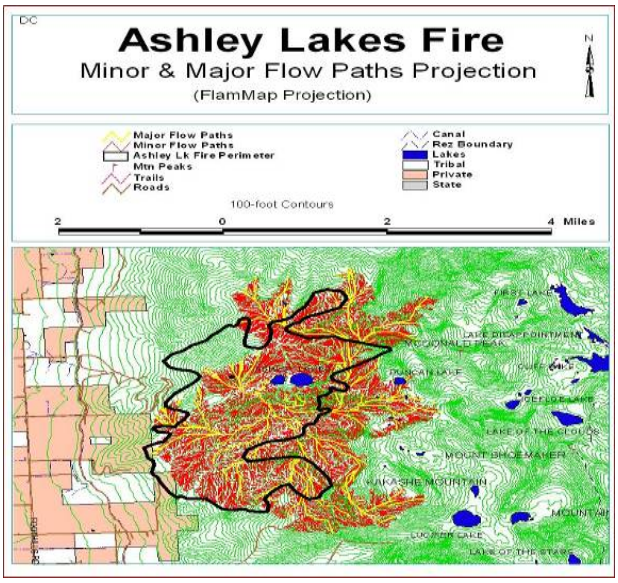

Figure B *- Fire perimeter outlined in black with a FlamMap projection in red showing the minor and major paths the fire would likely take based on fuels, weather, and topography.*