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Sanborn Wildland Fire Risk Assessment System (WFRAS)

Using the Latest in Risk Assessment Methods and Geospatial Software to Support Decision Making



Wildland Fire Risk Assessment System WFRAS Overview

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Through multiple projects over the past 10 years Sanborn has developed a robust suite of wildfire risk assessment methods and software tools. Tested and proven at regional and local planning scales, these methods provide a repeatable, consistent and comparable approach for assessing current wildfire risk conditions, identifying those areas most prone to wildfire, and evaluating different mitigation options.

These methods have been successfully implemented in 15 states in support of mitigation and prevention planning, budget allocation, and quantifying performance measures and accomplishments reporting.

Adopted by federal, state and local government agencies across the Southern and Western U.S., our solution leverages the latest in scientific achievements by integrating desktop and web GIS and remote sensing technologies.

The Problem

Wildfires are a growing problem across the Nation as climate change extends our fire seasons. Coupled with a historical policy of aggressively fighting fires this has resulted in a buildup of volatile vegetation and fuels. The consequence of wildfires has never been greater as the trend continues of people moving into the wildland. The Wildland Urban Interface (WUI) is the combat zone for wildfires – with significant potential social, economic and environmental impacts.

Photo courtesy of the County of San Diego, Land Use and Planning Department.



Fire professionals in all agencies are challenged with how we can reduce the risk to wildfire in the WUI, while responsibly allocating budgets to high priority areas for preparedness planning and for response and suppression. The cost of fighting fires continues to soar with annual occurrence of large catastrophic wildfires across many states. Few states are immune. It is clear that there is an increasing need for fuel treatments, mitigation planning, and prevention to reduce the risk to communities in the WUI.

To date, the lack of consistent, accurate information limits the success of preparedness planning. There is a general lack of reliable information to support decision making – including mitigation planning, prevention and response and suppression. Fire planners are challenged with quantifying the risk to communities and prioritizing

mitigation efforts to best protect people and their homes. In addition, with the current economic situation, there is an increasing demand to document accomplishments and performance measures – what is the effect of our mitigation efforts, and are we spending our budgets efficiently?

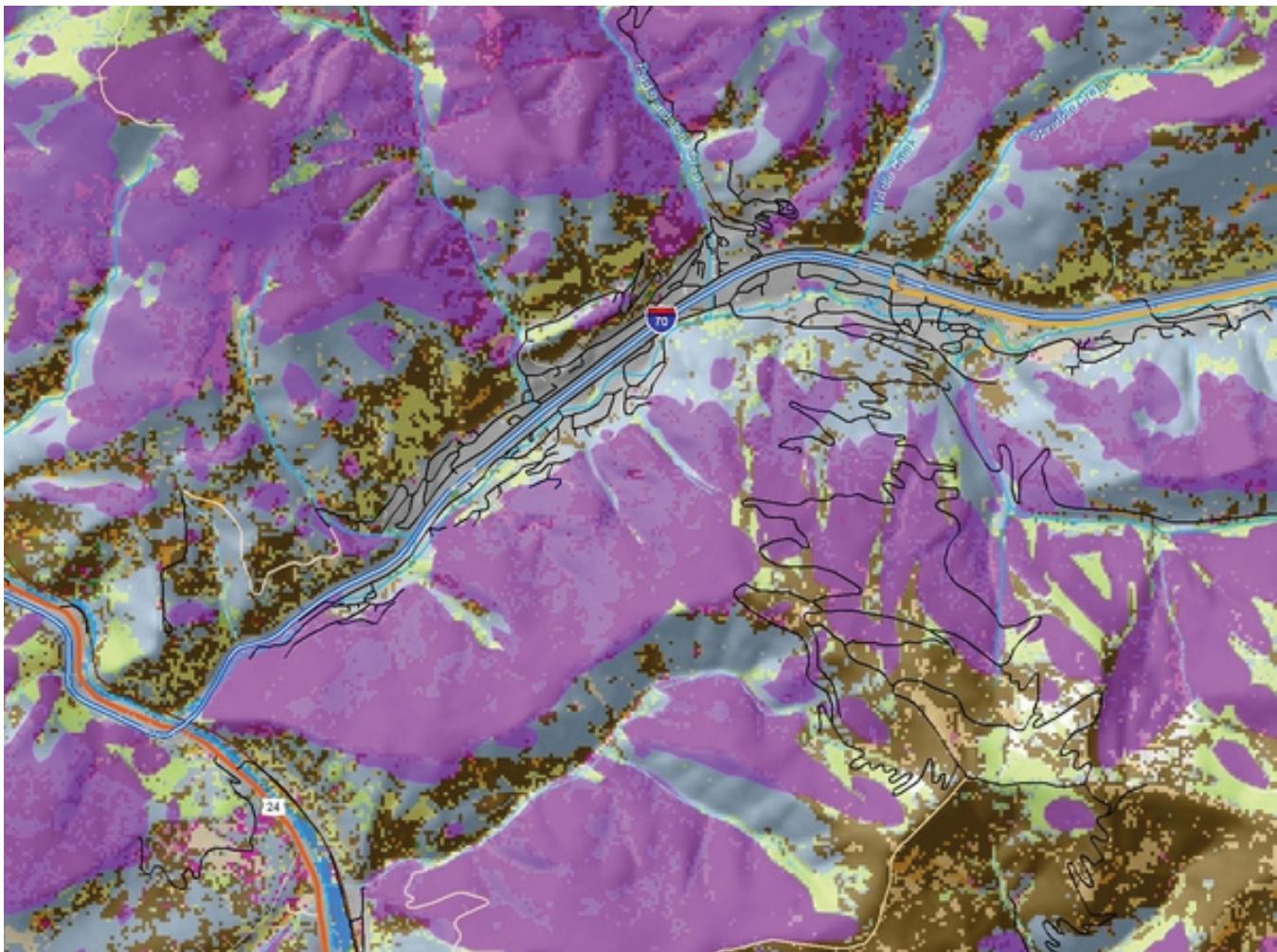
The Solution – Leveraging LANDFIRE data products to fuel WFRAS

There is a trend towards preparedness planning to continually reduce hazardous fuels and the risk from wildfire. This dictates accurate and timely information to support decision making and prioritization. Mitigation and prevention is the order of the day – and the combination of data, science and geospatial technologies provides solutions to meet these needs.



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Sanborn's WFRAS provides the technical platform that integrates these components
Combined with recent advancements in the availability of accurate source data, the barriers to wildfire risk assessment no longer exist. Previously, the effort of developing the key input data sets, such as surface and canopy fuels, was often cost prohibitive. However, with the implementation of the federal LANDFIRE program, a baseline dataset now exists for use with WFRAS to conduct risk assessment across the Nation.

Sanborn has recently pioneered methods to update and calibrate LANDFIRE fuels data to better portray current conditions. Bringing LANDFIRE up to date is necessary to reflect changes on the landscape that have occurred since the source imagery for LANDFIRE data was collected (circa 2000-2002). These changes primarily include urban growth and natural disturbances, such as large wildfires, insect and disease infestations, and hurricane blowdowns.

This Colorado example demonstrates how pine beetle disturbance data (shown in purple over surface fuels) can be used to update LANDFIRE data to more accurately represent current conditions

In addition, experience has shown that LANDFIRE data requires calibration to reflect more realistic fire behavior, a key component of the WFRAS risk models. This is especially true for canopy datasets. The combination of updated LANDFIRE and WFRAS provides the foundation for cost effective wildfire risk assessment.



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WFRAS provides a proven and robust wildfire risk assessment approach that is consistent across the Nation. The WFRAS process is based on a systematic, rational planning process initiated with an assessment of the current situation, followed by analyzing alternatives, implementation, and monitoring and evaluation steps.

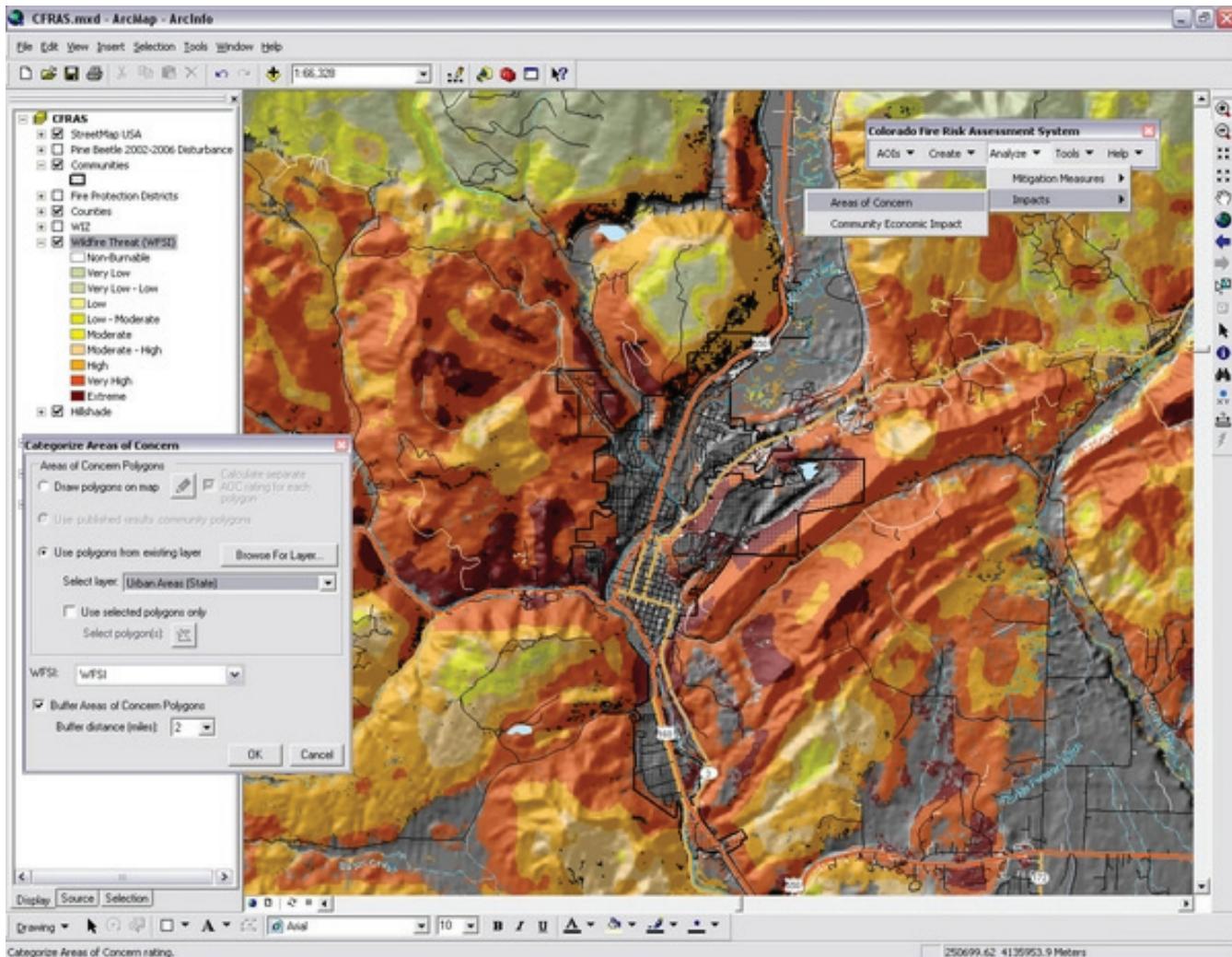
WFRAS has been adopted by federal, state and local government agencies in

the 13 Southern states, as well as recent implementations in Colorado and by the insurance sector in California. WFRAS has also been implemented for custom federal, state and County fire management projects.

The WFRAS risk models and analysis tools are encapsulated into an ArcGIS application that provides easy access to assessment results as well mitigation planning tools for a range of users. This application, delivered with each

WFRAS assessment, provides the tools necessary to use the results to derive the information necessary to support on-going planning efforts. WFRAS is deployed through a combination of Internet and desktop interfaces to meet the needs of fire analysts, planners, managers and the public.

WFRAS provides tools to aggregate wildfire risk outputs to assign ratings for Communities-at-Risk in the Wildland Urban Interface. This example shows wildfire threat for the Durango area of Colorado.





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Outputs – Using Assessment Results to Generate Outcomes

A series of standard maps, reports and GIS data are derived by WFRAS. These include:

- Updated surface and canopy fuels
- Likelihood for fire igniting (fire occurrence)
- Probability of a wildfire occurring (threat)
- Probability of loss or harm occurring (risk)
- Probability of severe damage to structures (susceptibility)

The WFRAS ArcGIS application also provides analysis tools to support on-going use of the data for the evaluation of mitigation alternatives, such as fuel treatment planning. These tools are powerful for determining the impacts of fuel treatments, and quantifying whether planned treatments will reduce the risk to communities, and subsequent dollar exposure and potential losses.

WFRAS also includes tools to quantify the risk to areas of concern, such as communities in the WUI. In addition, by integrating census and assessor data, WFRAS can quantify potential impacts of fires – including estimating losses to critical infrastructure, homes and people. Deriving information on dollar exposure helps planners document the need for mitigation, and prioritize those areas most exposed with the greatest potential for loss and harm.

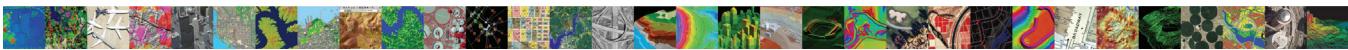
Benefits

WFRAS has been designed to maximize the benefit to fire planners and managers by focusing on providing the information critical for operational decision making. Development is on-going through collaboration with our clients to ensure that the tools and resultant information generated meets the needs of

WFRAS also includes analysis tools to integrate assessor data to calculate economic impacts based on wildfire risk, such as Dollar Exposure for the rebuild value of structures.

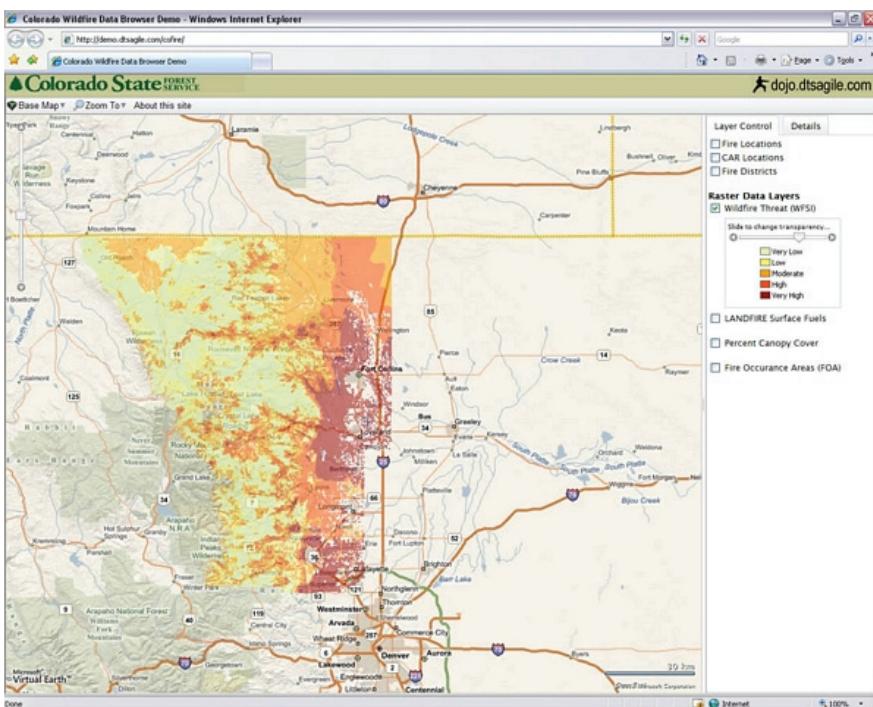
various stakeholders. The ability to share data with other agencies, and especially the public, is key. WFRAS has the following tangible benefits:

- Builds upon the federal LANDFIRE Program by putting the data to immediate use reducing the cost for fuels and canopy mapping
- Enhances LANDFIRE data to bring it up to date to reflect current conditions, as well as use it as a baseline for future projections
- Provides a consist repository of accurate information that can be used in conjunction with other agencies to support multi-jurisdictional planning and operations
- Provides the critical data needed to identify and quantify the potential impacts of wildfires such as exposure for critical infrastructure, people and structures
- Integrates with census and County assessor data to provide measures of economic and social impacts, in particular loss estimation and dollar exposure for:
 - structures
 - commodity agriculture, plantations
 - environmental impacts
- Supports planners to evaluate the economic return on investment for fuel treatment projects by calculating changes in risk and economic impact. These tools allow you to quantify the changes in fuels, level of risk, and dollar exposure based on simulated mitigation activities.



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For more information about Sanborn's

WFRAS visit our web site at:

www.sanborn.com/solutions/fire_management.asp,
or contact David Buckley at **905.727.8352** or
at dbuckley@sanborn.com

Assessment results can be delivered through Internet web sites integrated with public mapping interfaces such as Google Earth or Virtual Earth. The example below shows assessment results for two counties in northern Colorado served by ArcGIS Server integrated with Microsoft's Virtual Earth mapping platform.

WFRAS has been successfully used for the following purposes:

- Prioritizing mitigation activities by providing comparable and consistent information – where do we conduct fuel treatments?
- Communicating the risk situation to the public, in support of local Firewise and prevention efforts
- Communicating the risk situation to legislators and decision makers in support of federal and state funding initiatives
- Quantifying Communities-at-Risk ratings to support planning for where fuel treatments and mitigation activities will have the greatest benefit
- Helping states prioritize areas for allocating grants to Counties and communities

- Providing the risk information necessary for development of Community Wildfire Protection Plans and Operational Pre-Attack Plans
- Quantifying levels of risk for any area of concern, including watershed basins, and administrative and political boundaries
- Identifying areas where more detailed analysis, planning and prevention efforts are required, such as home assessments
- Support multi-jurisdictional planning for federal, state and local agencies
- Satisfying the wildfire hazard input requirements for FEMA based Hazard Mitigation Plans in support of DMA 2000