"Early Adopter" Nicole Vaillant: LANDFIRE is her Go-To Source

USFS Fire Ecologist Nicole Vaillant has used LANDFIRE products from dissertation to present day

Nicole Vaillant is a fire ecologist with the US Forest Service at the Western Wildland Environmental Threat Assessment Center. Her current research interests include characterizing fire behavior at multiple scales, burn severity patterns, fuel treatment effectiveness, and wildfire risk analysis. She is also involved with technical transfer and training for fuel management tools, specifically ArcFuels and the Interagency Fuel Treatment Decision Support System (IFTDSS). Nicole holds a Ph.D. from University of California – Berkeley in Environmental Science Policy and Management.
Contact Nicole

When and why did you start using LANDFIRE?

I started using LANDFIRE data around 2007 while I was in graduate school. It was really early in the days of LANDFIRE data, before the official national release in 2009. My dissertation looked at the effects and effectiveness of landscape-level fuel treatments on vegetation and potential fire behavior for the Sagehen Experimental Forest north of Lake Tahoe, CA. One of my chapters explored the impacts of using different data types and resolutions on potential fire behavior. We compared modeled fire behavior for existing conditions and various fuel treatment alternatives using LANDFIRE data and custom data derived from LiDAR informed by plot data. We contributed all our plot data and it was great to see how it was used to update and refine the LANDFIRE layers.

Your report in the Journal of Forestry March 2017 issue examines the US Forest Service's Hazardous Fuels Treatment Program and asks whether existing treatments do enough to promote resiliency or reduce hazard. How did LANDFIRE products support your inquiry and inform conclusions?

LANDFIRE data was the heart of my analysis. The fact that LANDFIRE is available wall-to-wall made it an amazing resource for consistent data across all National Forests in the lower 48 states. I used the annual *Disturbance* layers to determine when and where prescribed fires, mechanical treatments, and wildfires occurred. For area burned by wildfires I used the severity classification in the *Disturbance* layer along with *Fire Regime Group* to determine if severity was characteristic in a historic context. The *Mean Fire Return Interval* layer was used to estimate the annual area that would have historically burned as a proxy for amount of disturbance needed each year to create or maintain fire-adapted resilient landscapes. To characterize wildfire hazard, I did not use LANDFIRE data, but the Wildfire Hazard Potential product depends on the *Fuel* layers from LANDFIRE.

More …..

Tell us about other projects where you used LANDFIRE -- does any application stand out from the others?

The bulk of my research involves landscape-scale fire behavior modeling. LANDFIRE is my go-to source for creating the input files I need to characterize fuels and topography for modeling.

Wildfires in the western US frequently burn over long distances through highly fragmented landscapes with respect to ownership, fuels, management intensity, population density, and ecological conditions. My colleagues and I used LANDFIRE data to simulate wildfires across the Deschutes National Forest to understand the spatial interaction among different management designations and land ownerships. We did this for two landscapes. The first represented existing conditions. In the second, about 20% of the National Forest land was treated. We found that the size, shape, and fuel loading of management designations affected their exposure to wildfire from other designations and ownerships. Fuel treatments reduced the wildfire transmitted among the land designations.

What improvements might enhance LANDFIRE's usefulness?

For fire behavior modeling, having recent and temporally compatible fuels data is key. More timely and annual releases of data would make it easier to create the inputs needed for modeling. There are amazing tools to help critique and update LANDFIRE data but if it was more current to start that would be very helpful. Also, compatibility across versions would be great. Right now, different methods or rule sets are used to make updates between versions to characterize changes to fuels from disturbance and background succession and growth. This makes it difficult to use different versions to assess the impact of disturbances on potential fire behavior across time and space.

More about Nicole.

Featured publications

McCarley TR, Kolden CA, Vaillant NM, Hudak AT, Smith AMS, Kreitler J. 2017. Landscape-scale quantification of fire-induced change in canopy cover following mountain pine beetle outbreak and timber harvest. *Forest Ecology and Management*. 391: 164-75.

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Ager A.A, Day MA, Finney MA, Vance-Borland K, Vaillant NM. 2014. Analyzing the transmission of wildfire exposure on a fire-prone landscape in Oregon, USA. *Forest Ecology and Management*. 334: 377-90.

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