Wildfire and International Borders

Improving Fire Analysis Capabilities using LANDFIRE and the Fire Modeling Service Framework

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Perhaps more than in most years, 2023 reminded everyone that wildland fires are a growing, global issue. Smoke from fires deep in Canada affected many US population centers and because fire does not respect man-made boundaries or many natural ecological boundaries, managing fires near international borders presents unique challenges. For example, as fires approach international borders, decision makers need similar data sets and systems to provide continuous support and wildfire response actions on both sides of the border. Until the release of LF 2020 in 2022, these data didn't exist.

To address this issue, the LANDFIRE (LF) Program expanded key spatial layers into Mexico and Canada. Beginning with LF 2020 (released in 2022), vegetation and fuels layers now include a 90km (55 mile) buffer inside Canada (Alaska and CONUS) and Mexico. Erin Noonan, USFS Fire Analyst, Region 1 commented on this improvement:

> *"The benefit to see these fire models extend across the border is so important to understand the entirety of a fire's potential…..Traditionally, these models have been truncated at the border."*

LANDFIRE vegetation and fuels products in the United States and Canada are not identical because there are differences in the supporting data sets needed to develop the layers. For example, LF Existing Vegetation Cover (EVC) is delivered in 10% categories in Canada but 1% categories in the US.

When wildland fires burn near resources, assets, borders, etc., fire managers need to consider where and how fire lines should be constructed to support suppression actions. Fire behavior modeling provides the best information on predicting fire spread and other fire behaviors (flame lengths, rates of spread, travel time), etc. that could compromise a planned fire line and impact firefighter operations. These data and modeling capabilities help fire managers make decisions about where and how to employ firefighting resources and take actions that may have a higher probability of success. Before the release of LF 2020, this type of cross-border coordination was not possible, making fire response planning more difficult.

It took years of coordination for these international data to be fully developed and released. Because of the foresight of those involved, analysts can now conduct fire modeling simulations easier and faster. Prior to LF 2020, fire analysts would need to gather various data sets to create raster data for surface and canopy fuels, but the results were incomplete and imprecise making the final results uninformative.

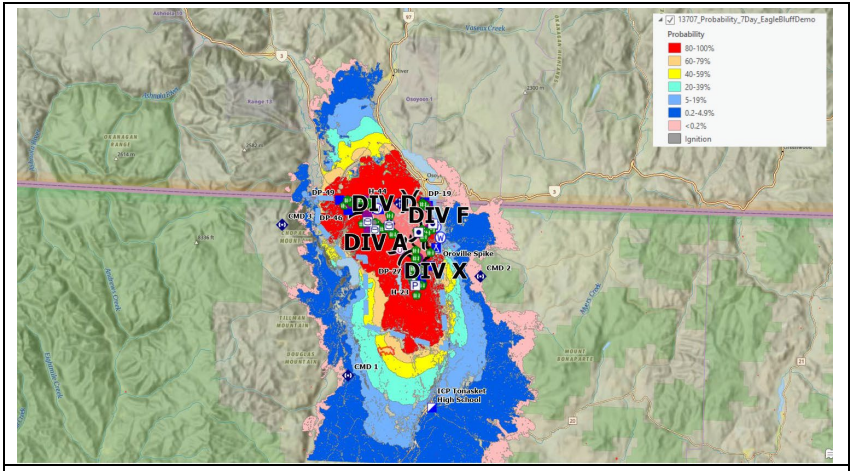
To prepare for the 2023 primary fire season, the United States Forest Service (USFS) and Canadian specialists worked together to develop the processes and tools needed for cross border fire planning given the new, extended spatial data from LF 2020. They accessed data from the LANDFIRE Product Service (LFPS) and processed modeling tools through the Fire Modeling Services Framework (FMSF). Because of this coordination, planners and wildland fire response personnel can now explore potential fire behavior that may approach or cross the border and in the event of a fire, have the data to model fire spread at or near the border.

Ben Curtis, Regional Fuels Specialist, Region 6, USDA FS PNW provided fire analysis support on several 2023 wildland fire incidents that tested these new data and tools, including the Eagle Bluff Fire and Crater Creek Fire (InciWeb Interagency all-risk information system). The following are two examples of near-border fires and analyses that were recently conducted to support fire and land managers:

Eagle Fire, Oroville, WA

The Eagle fire ignited west of Oroville, Washington on lands managed by the Washington Department of Natural Resources and Spokane District of the Bureau of Land Management. As of 7 August, the fire covered 16,428 acres, was 80% contained and was no longer considered active.

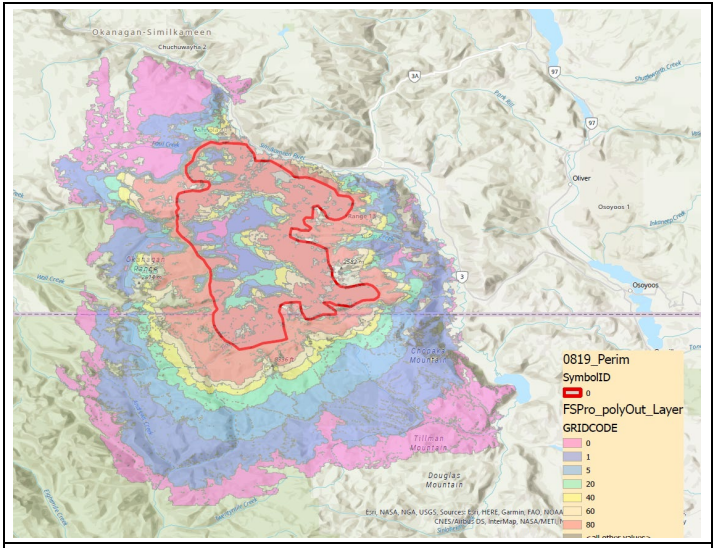
Because of the proximity of the Eagle fire to the Canada/US border, analysts utilized the new LFPS/FMSF capabilities. This image on the right shows a Fire Spread Probability (FSPro) analysis of the Eagle Fire and its potential behavior at the border.



Eagle Fire: 7-day burn probability from FSPro for the Eagle fire showing high probability of the fire crossing the border in the 7-day window.

Crater Creek Fire, British Columbia

The Crater Creek Fire began with a lightning strike in British Columbia, 11 miles southwest of Keremeos, on July 22 at 3pm. It eventually progressed across the US/Canada border. As of 23 August, the fire extended for 4,942 acres, primarily within the Pasayten Wilderness. The fire burned in remote and rugged terrain with poor access and was not threatening critical infrastructure or municipal watershed integrity. Even though the fire began in Canada, US fire planners/analysts could monitor the fire as it moved south using LF data that covered the ignition location. Prior to LF 2020, this would not have been possible.



Crater Creek Fire: 7-day runs of the fire simulator FSPro show where/when the Crater Fire (starting in Canada) would most likely cross into the US.

Conclusion

2023 is the proof in the pudding. Within one year of having data that spans our international borders, we are improving outcomes for communities and fire managers. These critical data (LANDFIRE) and tools (Fire Modeling Services Framework) are helping analysts improve their fire planning decisions in difficult, time-sensitive situations where international borders are in play and many differences (data, organizations, operations, etc.) exist across nations.

The combination of common data and tools and productive, collaborative efforts between specialists from US and Canada allowed analysts to make informed decisions when combating these recent wildfires that spanned international borders. Having these resources available will enable future international collaboration, safeguarding lives and critical infrastructure.