



Landscape-Scale Fire Regime Analysis Using LANDFIRE Datasets: A Foundation for Land Management Decisions

LANDFIRE Interviews Christine Droske, U.S. Forest Service Fire Ecologist

U.S. Forest Service (USFS) Fire Ecologist Christine Droske is working on a landscape-scale fire regime analysis that will provide the framework for management decisions in the [Salmon-Challis National Forest](#). A key to revising the Forest's Land Management Plan, the analysis will guide management direction for 4.2 million acres in north central Idaho, including 2 million acres within the [River of No Return Wilderness](#). She's particularly excited about this project because it will enable managers to use wildfire as a tool for restoration and to learn more about adapting to fire-dependent systems.



Christine started at USFS as a wildland firefighter, where she logged a decade in the western United States and Alaska as a hotshot and on a helicopter crew. Shifting to graduate school, she earned a Master's in Fire Ecology from the University of Idaho. Since moving to Salmon 6 years ago, Christine has focused leading project design and implementation on fuels treatment, prescribed fire, and forest restoration activities on the Salmon-Challis.

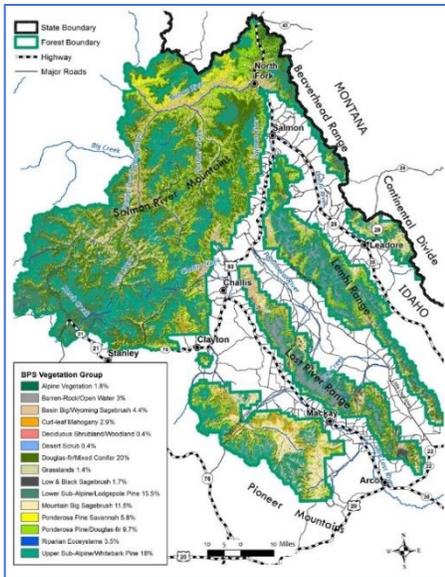
When did you first become affiliated with LANDFIRE or use its products, e.g. how did you find us, or we find you?

In 2003, I was on a field crew that collected vegetation plots to inform the early versions of LANDFIRE. We traveled all over Arizona and New Mexico identifying plants and trying not to get lost in the desert. It was a blast!

Then about a year and a half ago, I was trying to wrap my head around the fire regime analysis needed for Forest Plan Revision. I contacted Kerry Kemp, U of Idaho cohort and a good friend who now works for The Nature Conservancy. She directed me to Kori Blankenship on The Nature Conservancy's LANDFIRE team, who became my LANDFIRE guru.

You recently used LANDFIRE data as part of Forest Plan revision in the Salmon-Challis National Forest. What datasets did you use and what types of questions were you trying to answer?

National Forests are directed to maintain, restore, and enhance the ecological integrity and resiliency of our National Public Lands. As with many dry forest types in the western U.S., fire is an important part of these ecosystems, and functioning fire regimes are strongly linked to the function of terrestrial ecosystems. To establish a baseline for vegetation conditions, I worked with Kori to adapt the methods she developed and expanded them to include both forested and non-



forested vegetation types. Using LANDFIRE’s mean fire return interval for each of the Salmon-Challis’s dominant Biophysical Settings (BpS), I developed ranges for surface, mixed and stand-replacement fires. I then modeled the upper and lower values for these ranges to obtain the Historical Range of Variability for each BpS by Succession Class (S-class). LANDFIRE’s Existing Vegetation layer was then used to compare current conditions to the modeled baseline conditions.

This analysis provides us with a wealth of information that can be used to develop desired conditions at a landscape scale, develop and compare alternatives, and show spatially what areas should be targeted for different types of treatments.

Additionally, in order to use wildland fire as a tool to restore landscapes we needed a spatial dataset to model fire behavior based on fire risk to identified values on the landscape. With this

analysis ecological values can also be connected to fire management decision support tools and then monitored at the landscape scale through LANDFIRE’s nationally supported process for updates - a huge advancement in land management planning.

As with any dataset, LANDFIRE products have a learning curve. What were the biggest challenges you faced applying the products in your analysis?

I invested time to learn the methods behind this analysis, and each of the several steps had its own learning curve. Overall, those couple of months were well worth it, especially because I am currently working with the other resources specialists on the team. I find it's really valuable to be able to answer specific questions behind the process because their analyses will tier off mine.

Also, because the Salmon-Challis is 4.2 million acres, we decided to aggregate the 40 total BpSs into 15 total Vegetation Groups. This will allow us to better work with the information for project planning and fire management but also meant that we needed to develop and apply a ruleset in GIS to ensure the canopy cover and height assignments for each S-class were a good fit for the model we selected for each vegetation group. The folks at LANDFIRE were integral in providing the expertise to accomplish that.

What advice would you offer to other individuals (planners, managers, resource specialists) who want to use LANDFIRE data for similar land management planning efforts?

Revising a National Forest’s Land Management Plan can be a daunting task. The resulting document must have solid analysis and well-thought-out direction to meet National Environmental Planning Act requirements, which include the Endangered Species and Wilderness Acts, as well as Wild and Scenic River Suitability, Timber, and Rangeland suitability and many other USFS policies. The plan must weave scientific analysis with legal requirements and provide useful direction for managers on the ground for the next 15-20 years. Throw wildland fire and public safety into the mix and you have quite an interesting puzzle to solve!

Because the methods used to develop LANDFIRE are well-established and based on the best available science, we had a strong foundation on which to build our plan. By crafting management direction for ecological systems that include the variable of wildland fire and show a range of successional states and conditions, we can provide a useful picture of where, how much, and what kind of fire to manage for, and identify places where timber and fuels treatments are needed to address risk to ecological and social values. Further, the S-class data offer useful linkages to wildlife habitat metrics and other resource areas. Because these data are spatially explicit, we can classify, contrast, and point to on-the-ground management actions for many uses.

LANDFIRE datasets provide information in a format that allows for a multitude of potential GIS analyses. It was really important to connect with technical experts in the field and develop a process that was straightforward enough to be replicated.

What enhancements might improve LANDFIRE's usefulness? Where are areas of opportunity?

Newly revised Land Management Plans are strongly linked to the concept of adaptive management, which requires a well-thought-out monitoring plan. In the face of declining workforce and budgets within the USFS, the ability to measure and re-measure the effects of land management is increasingly challenging. Updating LANDFIRE data and processes on a regular basis to incorporate both the emerging science and changing conditions on the ground would be particularly useful to land managers at forest or regional scales.

More information

- Blankenship, Kori, Leonardo Frid, James L. Smith. [A state-and-transition simulation modeling approach for estimating the historical range of variability](#). AIMS Environmental Science, 2015, 2(2): 253-268. doi: 10.3934/environsci.2015.2.253.
- Salmon-Challis Forest Plan Revision Website: <https://www.fs.usda.gov/detail/scnf/landmanagement/planning/?cid=fseprd544724>

Coming soon: Preliminary results of this analysis will be published in autumn of 2018 as part of our 'Proposed Action' for the Salmon-Challis' Revised Land Management Plan. It will be posted on the website listed above.

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