LANDFIRE: From Brainstorming to Reality
An Interview with Wendel Hann

Wendel Hann had an exciting and fulfilling career with the U.S. Forest Service, starting as a seasonal firefighter in 1968, and retiring as the National Landscape Fire Ecologist in 2009. After serving in the Navy for four years (1972-1976), he went on to receive a PhD in Forest and Range Sciences from the University of Idaho (U of I), Moscow (1982), preceded by a Master and Bachelor of Science in Natural Resources and Agriculture from Washington State University, Pullman. Since retiring, Wendel has continued to stay scientifically active as a Landscape Ecologist consultant working on natural resource contract projects or through the U of I for the LANDFIRE (LF) Program.

His most fulfilling professional accomplishments have been enhancing the flow of science findings and data from research to natural resource and fire management through participation in the LF Program and other projects. Having always lived in rural communities and being involved in agricultural and outdoor activities, he said that since he was 16 years old, he especially enjoys taking recreational or work-related pack trips into backcountry and wilderness with his horse and mule pack string.

How did you become involved in LANDFIRE?

In 1998, the Forest Service Washington Office Fire Management offered me a position as the National Landscape Fire Ecologist. My first assignment was to work with the Forest Service Research Station National Fire Laboratory in Missoula, MT, on implementation of a map of Fire Regime Condition Class (FRCC) and an associated field guidebook for the Lower 48 states. This was developed using (coarse) 1-square km satellite vegetation data. At this time, it was important to remind leadership that user confidence was limited to very broad areas, such as statewide or regional summaries, but "not for use in your backyard or for local planning."

In 2000, I was summoned to a Washington Office Forest Service Directors meeting and subsequent Aviation and Fire Management meeting to present results of the 1-square km FRCC mapping. After reiterating that the data should not be used at local landscape scales, Leadership asked me what it would take to develop a map that could be used for more local "landscape" planning. I told them it would require 30-square meter Landsat data remote sensing, ground truthing, complex computer analysis and modeling, and Geographic Information System (GIS) mapping. Their response? "We want 30-meter data, so find out what it will take and get back to us ASAP."

Months later, following a series of meetings and an infamous pack trip to the Bob Marshall Wilderness Ranger Station, we developed the proposal. The initial LANDFIRE collaborators included Dr. Bob Keane (Fire Laboratory) and Dr. Zhi-Liang Zhu (USGS).

Originally referred to as the "30-meter project," the project was officially named when it was decided we should implement the proposal. I am fairly sure that it was Dr. Bob Keane that came up with the project name, LANDFIRE. (The spark of LANDFIRE was ignited.)

Exactly how did your group conceive of the LANDFIRE Program back in 2000?

My relationship with the Missoula Fire Lab goes back to the 1980s. There was a series of difficult broadscale management issues that I was tapped Regionally and Nationally to lead (or partner in leadership). These included forest and rangeland health assessment, Grizzly Bear recovery plans, Ecodata (now FEAT-FIREMON) and Forest Service Inventory processes, Whitebark Pine Assessment, Wilderness Natural Fire Plans, Old Growth Forest inventory, wildfire and prescribed fire, invasive plants, and riparian/native fish management strategies. At that time, we didn't have contiguous vegetation or fuel maps across the National Forests and almost none of these kind of maps on other agency or private lands. The only maps we had for these very complex issues were patchwork local maps developed project by project. This lack of contiguous mapping across all lands was very frustrating and often resulted in failure to achieve resolution of the pertinent land management issues.

These issues, projects, and demand for the need of "LANDFIRE like" data continued through the 1990s with increasing political intensity. At the same time, the Interior Columbia Basin Ecosystem Management Project (ICBEMP) was modeling and mapping most of Washington, Oregon, Idaho, and Montana at the coarse 1-km scale. Map products from that project caught the eye of the Forest Service fire and fuels leadership team, particularly Dave Bunnell, who ended up funding the Missoula Fire Lab to develop the fire regime and condition class 1-km maps of the lower 48 states. In 1998 I was assigned to assist in the completion and implementation of that 1-km map. As I previously mentioned, the frustration with the coarse nature of the 1-km map was felt at all levels from Washington Office to local and within members of (what was to become) the LANDFIRE team. From this collective vision came the birth of the finer scale "LANDFIRE like" data project.

The collective urgency to work together to achieve the scientific and technology expectations of "LANDFIRE like data" was felt from all participants. These early team members included a diverse group of scientists and managers from USGS, Forest Service, Bureau of Land Management, National Park Service, Bureau of Indian Affairs, State Forester representatives, The Nature Conservancy, University research, etc. Once given marching orders from the Washington Office to "make it happen," Dr. Bob Keane and I planned a wilderness pack trip for core technical members of the team to brainstorm methods. The trip in (hiking or horseback for 30 miles at 3 miles per hour), to the Big

Prairie Ranger Station in the Bob Marshall wilderness, gave time for all involved to experience the challenges we faced in mapping the diversity of ecosystems, vegetation, and fuels as well as team building for this loose knit group of people. This wilderness pack trip led to the origination of the first LANDFIRE plan.

Fast-forward 20 years, what do you think users want most from LANDFIRE products?

Wildfire risk to wildland-urban areas and to ecosystems is increasing. This trend is driving the shift to emphasis from users to fuel and vegetation product layers that are used as inputs to the fire behavior and wildland fire risk models. Many users want these existing fuels and vegetation products as current and as accurate as possible, and the loading of the data into the Wildland Fire Decision Support System (WFDSS) and Interagency Fuels Treatment Decision Support Systems (IFTDSS) to be seamless.

User desire for products has changed substantially from the first release of LANDFIRE to current releases. The driving need for users of the first release was FRCC, the deviation of current fire and vegetation regime from historical, to be used to infer risk or priority for fuel and vegetation treatment needs. This need was driven by how the coarse scale FRCC data was used in the National Fire Plan and Healthy Forest Restoration Act and subsequent budgeting and reporting of accomplishments. With subsequent development and implementation of the FRCC Guidebook for field use, the management implications became somewhat ingrained in field managers and their associated publics. However, in management, even given large increased fuel management funding that occurred since the late 1990s we have never been successful in getting ahead of the curve of increasing departure of the fire regime. This has been associated with exponential increases in wildfire risk driven by the high fuel loads across contiguous areas and longer and more severe fire seasons.

This focus on wildland urban fire risk is leaving many users behind that are more concerned with ecosystems. These are the local agency ecologists and members of the public that consider ecosystem health and fire regimes to be of equal importance to fire risk. These users would like more emphasis on producing the fire regime, fuel, and vegetation departures, and the potential fire severity measures. Given the budget resources allotted to LANDFIRE, my own opinion is that they are doing the best they can to meet both components of users. My hope is that LANDFIRE will be able to update and refine the fire regime, vegetation, and potential fire severity products in the coming years if budgets improve and they become more efficient in producing and updating the existing vegetation and fuel products.

Now that LF Remap has been released in the NW, SW, NC, SC, SE GeoAreas, what are the greatest improvements you've found about LF Remap?

LF Remap has substantially improved the quality and precision of the data, when compared to previous versions of LANDFIRE. For example, the patch size and naming of blocks of 30-meter pixels is much more fitting with what occurs on the ground. I would have to say emphatically, AMAZINGLY SO. The increased number of field plots, the auto-key mapping regions with keys to identify plots and pixels to vegetation type, improved algorithms to vegetation cover and height, and the incredible advancements in satellite imagery have paid off. Of most importance, the experience, commitment, and project knowledge of the LANDFIRE team has paid off, AMAZINGLY SO. Congratulations LANDFIRE team; project well done!

Are there any other improvements that could enhance LANDFIRE's usefulness?

LANDFIRE data in many cases is now the starting point for project planning. Therefore, I think LANDFIRE should respond, as best they can, to the need from local agency ecologists, foresters, range cons, biologist, etc. and their involved publics, for fire and vegetation regime departures, potential fire severity outcomes, and a refined natural or historical fire regime classification and mapping. My hope is that LANDFIRE can respond to the need to map a Biophysical System (BPS) and fire regime classification and departures that accounts for changing environment of fire season length and weather. There is a somewhat desperate local need for field keys to Existing Vegetation Type (EVT) with keys that are integrated from the top down, so they work across local boundaries.

What about your work with LANDFIRE do you believe is particularly important to LF users?

I am pleased that I could help bridge the divide between fire and vegetation research and management, and between state and private agencies that eventually produced LANDFIRE. The lack of continuous vegetation, fire regime, and fire behavior input maps drove my desire to help lead the LANDFIRE charge. We used our collective need for reliable, accurate, localized data to create the LANDFIRE program. Twenty years later, there is an updated series of products that many users apply day to day and is of importance to our stakeholders.

What do you believe lies ahead for LANDFIRE?

In future decades we will face an exponential increase in the stresses of land and disturbance (fire and other influences) management and working with and serving people. The LANDFIRE program, and others, will need to expand to address needs of our federal and state agencies, The Nature Conservancy, and private lands partners; the military, national security, and global environmental crises. Soon we will need to address program longevity and technology of annual updates to bring forth the ecological measures in equal priority with fire behavior inputs. Even more exciting, we may have the opportunity to use LANDFIRE to work internationally with Canada and Mexico to address continuous mapping options for North America. LANDFIRE’s leadership and examples may be helpful in addressing worldwide land management and conservation data solutions.