



Checking in with NatureServe's Pat Comer: LANDFIRE EVT Maps and More



Patrick (Pat) Comer, [NatureServe's](#) Chief Ecologist, coordinates ecology activity from the Boulder, Colorado office. For 30+ years, his applied research has focused on ecosystem classification, spatial modeling, ecological assessment, and systematic planning support for conserving biodiversity and sustainable development.

After completing graduate work in Forest and Landscape Ecology at the University of Michigan, he served in the Peace Corps in Costa Rica, joined the Michigan Natural Features Inventory as an ecologist where he conducted systematic field inventories of forest, savanna, and wetland ecosystems, and led an unparalleled effort to produce a detailed digital map of vegetation for the State of Michigan, c1800. Later, as Western Regional Ecologist for The Nature Conservancy, Pat developed novel methods for ecoregion-scale assessment and planning programs across the Americas.

Based on his experience in ecoregion-scale analysis, Pat led the development of what became NatureServe's terrestrial ecological systems classification, which formed the basis for regional mapping of natural land cover mapping, first with the USGS Gap Analysis Program, and second, as the Biophysical Settings (BpS) and natural Existing Vegetation Type (EVT) classes for LANDFIRE. Pat joined NatureServe in 2002 and has been advancing methods to map terrestrial ecosystems all across the Americas, assessing their ecological integrity and rangewide at-risk status, gauging their vulnerability to climate change, and applying that knowledge to natural resource planning, management, and monitoring. Pat and other NatureServe ecologists currently work with LANDFIRE mapping teams to update EVT maps.

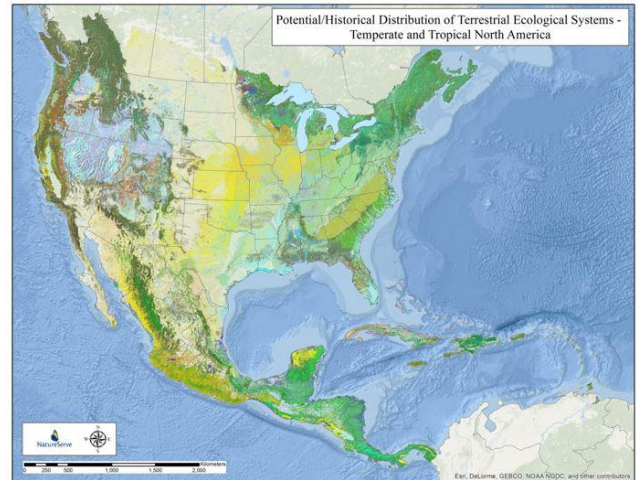
What is your LANDFIRE connection?

I got engaged with LANDFIRE in 2004 when there was a need to establish a nationally consistent classification for use in the developing concepts of BpS and EVTs. I first worked with Don Long (US Forest Service) on that, along with all the others from the Fire Lab who originated LANDFIRE methodology and mapping methods.

NatureServe and LANDFIRE have worked hand-in-hand since 2004. Tell us about the collaboration.

NatureServe ecologists have in-depth expertise in the vegetation of the United States and beyond. We work closely with ecologists from the Natural Heritage Program network, who tend to be key experts in their states. Because of this, we provide ongoing support for the use of the terrestrial ecological systems classification, and now the U.S. National Vegetation Classification (USNVC), for use in fire regime modeling and mapping by LANDFIRE.

We specifically help to establish LANDFIRE map legends and have generated range maps for each vegetation type to be mapped. We also designed software tools we call “autokeys” that automate the process of labeling georeferenced vegetation sample plots to these standard classifications. This automation is needed because LANDFIRE utilizes well over one million vegetation sample plots in its mapping processes across the country. Mappers use those labeled samples and remote sensing data with machine learning algorithms to generate, and later evaluate the quality of the BpS and EVT maps.



Modeled extension of BpS beyond the US to get at full distributions of temperate and tropical ecological systems. This area includes ~ 620 upland and wetland ecosystem types.

Over the past decade, LANDFIRE has been one of the primary motivators to advance the classifications of Ecological Systems (ES) and the USNVC. Engaging ecologists to describe biophysical settings and wildfire regimes, and then mapping these concepts directly, provides a meaningful “test” of each classification, and has led to many refinements.

What part of your work is most interesting to you (doesn't have to be LANDFIRE-based)? Where's the fun?

From early in my career, it has been clear to me that we need high quality, wall-to-wall maps of vegetation type composition and structure. We need this worldwide just as soon as possible. Why? Because these maps, and especially where we can remap every few years to show change over time, provide a foundation for understanding trends in the location, extent, condition, and function of terrestrial ecosystems that we all depend on.

LANDFIRE maps and models are used every day by land managers like the Bureau of Land Management (BLM). We used the data in all of the BLM rapid ecoregional assessments. We (NatureServe) have depended on LANDFIRE BpS and EVT in our analysis of climate change vulnerability for major upland vegetation across the country. More recently, I have utilized these same data to prototype ecosystem red listing under international criteria set by the International Union for Conservation of Nature (IUCN).



I get the most satisfaction (and have lots of fun!) when I can get out in the field to understand ecosystem patterns across a given landscape, and then apply that knowledge to making good decisions for conserving biodiversity and ecosystem services. One fun memory of working with LANDFIRE I have is that in early days while working on mapping approaches in Alaska, I had the opportunity to fly all across the Cook Inlet with a BLM bush pilot trying to figure out what vegetation types I could recognize from the plane at different altitudes. The photos of that spectacular landscape are on my computer screensaver.

Where do you see LANDFIRE and NatureServe going next?

First, LANDFIRE products continue to advance in their quality and in the number of ways they can be applied to conservation. We need to look for new ways to evaluate and document the quality of these products, and then communicate that knowledge to the broad range of users.

Second, in order to keep advancing, we need a continual investment to secure high-quality georeferenced vegetation samples. There are increasing opportunities to utilize field observations of vegetation from many different sources, fill in gaps, and make our map products as good as they can be.

Third, I am excited about NASA's upcoming Surface Biology and Geology mission with instruments from satellites and the international space station, which will bring a lot of new remotely sensed data for use in ecosystem mapping and assessment.

Contact

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Publications

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Website Resources

[NatureServe Ecosystem Classification](#)

[Climate Change Vulnerability Index for Ecosystems and Habitats](#)

[Continent-Scale Landscape Conservation Design for Temperate Grasslands of the Great Plains and Chihuahuan Desert](#)

[NASA Earth Science](#)