Maps, Models, Metrics
LANDFIRE Interview with Applied Conservation's Greg Low

Greg Low and partner Henry Little established Applied Conservation LLC in 2011. The company provides consulting and facilitation services to public agencies, nonprofit conservation organizations, private landowners, and other partners in conservation action planning, forecasting, implementation, environmental dashboards, and organizational development in landscapes ranging from 50,000 to over 1,000,000 acres.

Prior to founding Applied Conservation, Greg held leadership positions at The Nature Conservancy (1974 to retirement in 2010) including Executive Vice President and Managing Partner for U.S. Conservation. He spearheaded the development of state-based programs and landscape-level conservation projects, including developing and managing the Conservancy's first landscape-level project on the Virginia Eastern Shore.

What LANDFIRE products have you used in your work?

I use an approach called Landscape Conservation Forecasting (LCF) that is founded on, and relies heavily upon, LANDFIRE methods and products.

LCF uses what I call "three M's" from LANDFIRE – maps, models and metrics – that allow land managers to determine the current condition of ecosystems, forecast future conditions if no action is taken, forecast future conditions under alternative management actions, and determine which management actions will achieve the highest return on investment.

> Maps. LCF analysis is based upon either LANDFIRE map data, local remote sensing or other local data where LANDFIRE's classification methodology is used. At the core are vegetation succession class data for each ecological system, for both potential natural vegetation and current vegetation. (Rather than the LANDFIRE term "biophysical settings," we use the term "ecological systems," which is more intuitive for land managers.)

> We have used LANDFIRE data directly for very coarse level analysis of large landscapes such as the northern Sierra Nevada.

> Models. LANDFIRE provided an enormous service (and an under-appreciated one) in developing models for every terrestrial ecological system in the United States. The LANDFIRE-based state-and-transition models are another foundational element of LCF, allowing us to forecast future conditions under alternative management scenarios, using the

ST-Sim software that LANDFIRE championed and supported. When working with local land managers, we typically revise/refine the LANDFIRE models and sometimes develop whole new models to more accurately reflect local conditions.

Metrics. Again, LANDFIRE provided a valuable (and under-appreciated) service in developing the metric originally labeled Fire Regime Condition Class. In LCF this metric is called "ecological departure." Bob Campbell with the Forest Service in Utah called it the "out-of-whackness" measure. We've developed supplemental local metrics but the ecological departure measure remains the foundation of LCF.

Why were those products helpful – what unique value did they provide you?

Using LANDFIRE-based map data, models and metrics, we are able to show the overall health of every ecosystem in a landscape, on a score of 0 to 100.

It is invaluable to be able to incorporate these data and models into ST-Sim software in order to forecast the future condition of every ecosystem if no action is taken and also under alternative management treatments and scenarios. We can examine which treatments produce the best results, and which provide the most bang for the buck. LCF gives land managers a strong science-based platform for NEPA documents and a transparent process to help build consensus among resource managers and stakeholders.

What landscapes have you worked with using those LANDFIRE products?

In 2009, we first applied LCF in the Bodie Hills of eastern California (2009), where The Nature Conservancy (TNC) worked with the local Bureau of Land Management (BLM) and private landowners. Louis Provencher (TNC Director of Science, NV) and Susan Abele (formerly with TNC, now with Fish and Wildlife Service) and I wrote an article for the *Journal of Conservation Planning* describing the LCF methodology and results which we then called "enhanced conservation action planning."

At TNC, we applied LCF on landscapes in Utah and Nevada, working with the US Forest Service and BLM local offices, and with the National Park Service. Louis continues to expand the LCF envelope with new applications, such as climate change assessment and sophisticated models and metrics for sage grouse habitat conservation in eastern Nevada.

I have also worked with land managers and local partners in the Cherokee National Forest in eastern Tennessee, the Pike National Forest in Colorado, and most recently with the Great Smoky Mountains National Park.

What improvements can you suggest that might improve LANDFIRE's usefulness?

The ongoing national BpS model review is much needed. However, in doing the review for the Southern Appalachians, I know that the reviewers are looking at varied models developed for the same BpS, as well as entirely new models for systems that have been mapped with local data. Moreover, we are now developing an ever-growing set of *management* models in LCF, incorporating

prescribed fire, thinning, weed treatments, and so on. Some models have been well documented, others not so well.

I think we badly need an easily accessible "library" of all of these ecological models (both written and ST-Sim versions), perhaps even some modified wiki-style approach that allows users to see and comment on the rationale for any proposed model changes. This library/database/wiki would include but go well beyond LANDFIRE's "core" set of models for all U.S. ecological systems.

In addition to reports hyperlinked in the interview above, here's more about Greg, LF and LCF …

- Forecasting the Benefits of Conservation Strategies to Land Managers. Keynote presentation/video about landscape conservation forecasting applications. Ecological Modeling Conference, Portland, OR, June 2011.
- Landscape Conservation Forecasting. *LANDFIRE YouTube Channel*. (4 videos)
- Low, Greg, Louis Provencher and Susan Abele. 2010. Enhanced conservation action planning: Assessing landscape condition and predicting benefits of conservation strategies. *Journal of Conservation Planning* 6: 36-60.
- Poster/primer: Landscape Conservation Forecasting
- Provencher, L., T. Anderson, G. Low, B. Hamilton, T. Williams and B. Roberts. 2013. Landscape Conservation Forecasting for Great Basin National Park. *Park Science* 30(1):56–67.
- Tuhy, Joel, Louis Provencher and Greg Low. 2010. Landscape Conservation Forecasting: Report to the Powell Ranger District, Dixie National Forest.