

















WEB-HOSTED APPLICATION MAP PROJECTS - Updated June 2018






<http://maps.tnc.org/landfire/>






The LANDFIRE Web-Hosted Applications Map (WHAM!) is an online, interactive map that calls up many of the applications, their locations, and the partners we work with. This table comprises the list of applications on the WHAM! by geographical location. Need more? Write to landfire@tnc.org.







Project	Description
<p>2013 Wildfire Season Overview: Southwestern U.S.</p> 	<p>It is important to review the major fires in a region to help the public and fire professionals understand the situation more completely. A great deal of information about what happened is available, but rarely does everyone see post-fire information on burn severity or comparisons between fires. This report is an attempt to fill the need for a concise, timely publication that summarizes the season's fire details in the Southwest, and compares the major fires and demonstrates regional trends from this past fire season. LANDFIRE EVT and VCC were key components of the analysis.</p>
<p>Alaska: Microbial Responses to Fire in Boreal Forests</p> 	<p>Holden et al. observed, due to fire severity, the responses of soil microbial biomass, the carbon dioxide release of those microbes, and how fungus environments are affected from these fires. LANDFIRE EVT data helped inform their work.</p>
<p>Alaska: Seward Peninsula–Nulato Hills–Kotzebue Lowlands Rapid Ecoregional Assessment</p> 	<p>The Bureau of Land Management in conjunction with NatureServe is conducting a Rapid Ecoregional Assessment for the Seward Peninsula, Nulato Hills, and Kotzebue Sound Lowlands Ecoregions in Alaska. The goals are to understand the ecoregions' existing conditions and to determine how the regions might respond to ongoing environmental changes and land use demands. LANDFIRE products, including vegetation type and vegetation dynamics models, are being used along with other data sets to answer these questions.</p>
<p>Arizona: Assessment of Climate Change in the Southwest United States</p> 	<p>Fleishman et al. discuss how the measurable effects of climate change such as increasing temperatures and aridity as well as earlier snowmelt and peak streamflow will affect geographic species distribution, land cover and types, phenological cycles of the ecosystem, and changes in disturbances regimes. Authors used LANDFIRE Existing Vegetation Type data to mask out non-forested or non-woodland ecosystems for assessment of wildfires.</p>






<p>Arizona: Carbon Credit Possibilities and Economic Implications of Fuel Reduction Treatments</p> 	<p>Authors assessed carbon stocks in treated and untreated Ponderosa Pine forests of the Apache and Sitgreaves National Forests, N. AZ over 100 years under assumed treatment scenarios, wildfire frequency, and annual percentage of area burned. The heavier thinning treatment resulted in lower carbon emissions from wildfires than with the lighter thinning treatment, and both treatment scenarios resulted in lower total carbon stocks than the no treatment scenario. LANDFIRE 2008 Vegetation Departure data were used to prioritize treatment areas.</p>
<p>Arizona: Comparing Single Scale Modeling with Multi-scale Modeling When Examining Habitat Selection for the Mexican Spotted Owl</p> 	<p>Timm et al. examined the habitat selection of the federally listed “threatened” Mexican spotted owl in northern Arizona, using a multi-scale modeling framework. This paper determined that observing habitat selection using a multi-scale framework can provide more pertinent information for improving conservation and management practices. LANDFIRE Existing Vegetation Type and Elevation datasets were inputs to the model.</p>
<p>Arizona: Identifying the Movement of Bighorn Sheep and Elk through Conservation Corridors in Northern Arizona</p> 	<p>Keeley et al. examined dispersal and long-distance movements of the bighorn sheep and elk through wildlife corridors. Its two objectives included developing a procedure to estimate habitat suitability and create a transformation function to translate habitat suitability into resistance. This paper also introduced mean cost rank (MCR) as a method for evaluating models and how they can be used to predict long distance paths of bighorn sheep and elk. It was noted that further research needs to be done on less mobile mammals. LANDFIRE EVT data were used.</p>
<p>Arizona: Representation of Ecological Systems in U.S. Protected Areas</p> 	<p>Aycrigg and others evaluated the Representation of Ecological Systems within the Protected Areas Network of the Continental United States using land cover data from GAP and LANDFIRE. Their study found that certain vegetation communities were underrepresented and they explored ways to increase the representation of ecological systems in U.S. protected areas.</p>
<p>Arizona: Southwest Forests and Grasslands Ecological Assessments</p> 	<p>The U.S. Forest Service Southwestern Region used LANDFIRE data to inform its Forest and Grassland Ecological Assessments as part of the forest plan revision process. Revision of the region's forest plans involves ecological, social, and economic assessments that determine which elements of the current plan need to be changed. The region's analysis team used LANDFIRE's Vegetation Dynamics Models, Vegetation Condition Class maps and other map data to characterize historical and current vegetation conditions, as required for the development of ecological assessments.</p>





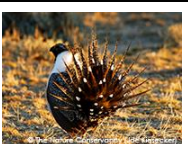
<p>Arkansas: Shortleaf Pine Restoration Monitoring</p>		<p>The goal of the Short Leaf - Bluestem Community Project, funded by the Collaborative Forest Landscape Restoration Program (CFLRP), is to restore large swaths of shortleaf pine-bluestem habitat on the Ouachita National Forest. The desired condition for this habitat includes mature pine trees and scattered oak with an understory of bluestem grasses and other prairie species. LANDFIRE and other data are used to monitor progress towards this desired ecological condition.</p>
<p>Arkansas: Simulating Treatment Effects in Pine- Oak Forests of the Ouachita Mountains</p>		<p>In their extended abstract, Simulating Treatment Effects in Pine-Oak Forests of the Ouachita Mountains, Shlisky and others describe how a LANDFIRE vegetation dynamics model for pine-oak forest was adapted for the Ouachita National Forest, AR to demonstrate the use of the models in project planning and creating “what if” scenarios to supplement project environmental impact assessment.</p>
<p>California: Assessing Wildfire Risks Close to Dwellings and Examining Fuel Management Techniques on US Forest Service Land in the Sierra National Forest</p>		<p>Using a LANDFIRE fire modeling landscape file, Scott et al. explored the effectiveness of fuel treatment procedures on wildland urban interface (WUI) within close proximity to national forest land and looked at the threat of fire spread from the ignition location, or risk transmission, and finally explored alternate fuel management procedures and</p>
<p>California: Bodie Hills Landscape Conservation Forecasting</p>		<p>In September 2007, the Bureau of Land Management’s Bishop Field Office entered into a cooperative agreement with The Nature Conservancy to develop a conservation action plan using Landscape Conservation Forecasting methods. Approximately 200,000 acres in California’s Bodie Hills and northern Mono Basin are in the study area. LANDFIRE data and models were used to compare current vegetation departure with reference conditions. The results help land managers make decisions based on best return on investment scenarios.</p>
<p>California: Effectiveness of Fuels Treatments in the Context of Climate Change</p>		<p>In the study Assessing Fuels Treatments in Southern California National Forests in the Context of Climate Change, Brown and others modeled fire behavior using LANDFIRE fuels layers to test the effectiveness of six fuel treatments under projected future extreme fire weather.</p>
<p>California: Fire Frequency in California</p>		<p>This project was designed to generate a current, comprehensive summary of pre-settlement fire frequency estimates for California ecosystems that are dominated by woody plants, and then develop a foundational fire return interval departure (FRID) mapping and analysis report. LANDFIRE Biophysical Setting information provided the framework for the analysis.</p>
<p>California: Bobcat Habitat Fragmentation</p>		<p>The impact of habitat fragmentation on the functional connectivity in bobcat populations in coastal southern California was investigated by E.W. Ruell et al. and reported in American Midland Naturalist, 2012. Land-use dataset and vegetation cover data were supplied by LANDFIRE.</p>






<p><i>California: Measurement of Scenic Character Conditions Using LANDFIRE Vegetation Departure Data</i></p>		<p>Scenic Character is a primary value in all recreational settings, communities, and tourism-based economic attractions. Forest vegetation and scenic character have been widely altered and impaired through wildfire suppression activities and other ecosystem changes across many national forests and public lands. LANDFIRE Vegetation Departure provides a quantitative measure of the historic, native vegetation aspects of this scenic character.</p>
<p><i>California: Mojave Basin and Range Rapid Ecoregional Assessment</i></p>		<p>The Bureau of Land Management in conjunction with NatureServe conducted a Rapid Ecoregional Assessment for the Mojave Basin and Range Ecoregion. The assessment area covers 50,000 square miles, mainly in southeast California and southwest Nevada, and includes all or portions of 14 BLM field offices. LANDFIRE products, including vegetation sample data, vegetation type, fuel model and fire regime maps, and vegetation dynamics models, were used to understand existing ecoregion conditions and determine their potential responses to environmental changes and land use demands.</p>
<p><i>California: Natural Ecosystems: A Report Prepared for the National Climate Assessment</i></p>		<p>Existing relations among land cover, species distributions, ecosystem processes, and human land use are the basis for projecting ecological responses to different scenarios of climate change. However, projections based on current relations are likely to be inaccurate. Additionally, changes in climate, species distributions, and disturbance regimes will affect the ability of ecosystems to provide useful habitats, maintain ecosystem processes, and serve as reservoirs of carbon. LANDFIRE Existing Cover data was used to map forested areas.</p>
<p><i>California: Northern Sierra Nevada Climate Change Analysis</i></p>		<p>The Northern Sierra Partnership initiated the Northern Sierra Climate Change Project to examine how potential future climates will affect the flora and fauna of the northern Sierra Nevada. The goal of the project was to assess the predicted impacts of climate change on the region and identify cost-effective strategies for maintaining ecosystem resilience in the face of change. LANDFIRE vegetation dynamics models, biophysical settings maps, and succession class maps were modified and used along with other datasets to complete the assessment.</p>
<p><i>California: Potential Future Land Use threats to California's Protected Areas</i></p>		<p>The authors worked to assess land use conversion around California's protected areas. The group considered logging as one potential land-use change, and used LANDFIRE's Vegetation Change Tracker and Forest Inventory and Analysis (FIA) data to identify initial stand age in their modeling.</p>







<p><i>California: Value of Wildland Habitat for Pollination Study</i></p>		<p>LANDFIRE existing vegetation data were used to create a “pollinator–relevant natural habitat map” for estimating the value of pollination services provided by wild bees to California agriculture. Read the report Value of Wildland Habitat for Supplying Pollination Services to Californian Agriculture. <i>Society for Range Management</i>, June 2011. 36–41. Authors are Rebecca Chaplin–Kramer, Karin Tuxen–Bettman, and Claire Kremen.</p>
<p><i>California: Wildland Fire Entrapment Avoidance - Modeling Evacuation Triggers</i></p>		<p>One potential tool for assisting fire managers in situations where human factors can hinder decision-making is the Wildland-Urban Interface Evacuation (WUIVAC) model. Utilizing multiple combinations of escape routes and fire environment inputs based on the 2007 Zaca fire, the authors created trigger buffers for firefighter evacuations in order to examine trigger buffer sensitivity to evacuation mode, and expected weather and fuel conditions. LANDFIRE spatial fuel data products were used to inform the process.</p>
<p><i>Colorado: Characterizing Recent and Projecting Future Potential Patterns of Mountain Pine Beetle Outbreaks in the Southern Rocky Mountains</i></p>		<p>Lu et al. took a comprehensive approach and considered a large set of relevant factors to improve our understanding of the spatiotemporal patterns of Mountain Pine Beetle outbreaks and investigate their drivers. Based on historical record of forest disturbance and the models developed in this study, researchers used Landsat-derived disturbance maps and LANDFIRE Existing Vegetation Type data to provide a means of simulating the landscape-level outbreak pattern over time. The major controls on the observed patterns of MPB mortality during the period of this study included residential housing density, density of adjacent MPB mortality in previous years, and climate predictors.</p>
<p><i>Colorado: Development and Assessment of 30-meter Pine Density Maps for Landscape-level Modeling of Mountain Pine Beetle Dynamics</i></p>		<p>The authors developed spatially explicit datasets of pine density at 30m resolution using existing geospatial datasets of vegetation composition and structure. Regression analyses based upon LANDFIRE ecological systems classifications showed that the best pine density estimates explained 75 - 98% of cumulative MPB-caused tree mortality. LANDFIRE Existing Vegetation Types effectively delineate distinct vegetation types that are meaningful suitability indicators for MPB-caused tree mortality. Report: Development and Assessment of 30-meter Pine Density Maps for Landscape-level Modeling of Mountain Pine Beetle Dynamics.</p>
<p><i>Colorado: Fire Emissions and Carbon</i></p>		<p>A regional model was used to estimate the potential reduction in fire emissions when a prescribed burn is applied in the dry, temperate forested systems of the western U.S. LANDFIRE maps and data indicate which forest classes would be suitable for prescribed burns.</p>







<p><i>Colorado: Fish Assemblages with Current Projected Oil and Gas Development</i></p> 	<p>This research explored potential relationships between energy development and fish associations in the western U.S. Colorado River Basin. Although existing development has not substantially influenced regional fish assemblage structure, it appears to affect a subset of species. Understanding assemblage-level responses to development can help land managers determine appropriate development levels, prioritize areas for monitoring associated with future development, and identify where land protection measures may be needed to offset potential risks. Riparian classes were selected from LANDFIRE Existing Vegetation Type to narrow analysis area, and as factor in regression analysis.</p>
<p><i>Colorado: The High Park fire, Coupled Weather/Wildland Fire Model Simulation of a Windstorm-Driven Wildfire in Colorado's Front Range</i></p> 	<p>Using LANDFIRE surface fuel models and other data sets prediction models Coen and Schroeder analyzed the effects of a windstorm on the first-day's growth of the High Park Fire in Colorado's Front Range in comparison to a simulation of wildland fire behavior model to assess the extent to which drought, wind, and fuel flammability affected burn severity patterns. The simulation and comparison showed significant differences in burn patterns and severity with moderately dry fuels or drought-level fuels.</p>
<p><i>Colorado: Mosquito Modeling</i></p> 	<p>Schurich et al. (2014) used LANDFIRE Existing Vegetation Type and other spatial data to model mosquito habitat across the northern Colorado Front Range. Authors found that the low elevation areas were more likely to have suitable mosquito habitat and that irrigation and water control areas provide larval habitat. Data will be used to target larval treatments across the landscape.</p>
<p><i>Colorado: Pine Beetle Mapping</i></p> 	<p>Mountain pine beetle outbreaks are becoming more frequent and extensive in western North America. With impressive accuracy (~86-94%), Liang et al. (2014) used imagery, LANDFIRE Existing Vegetation Type data, decision tree analysis, and noise reduction techniques to map MPB infestations over an 11-year period.</p>
<p><i>Colorado: Plant Abundance in the Great Plains</i></p> 	<p>A study by Nicholas Young et al. compared the results and accuracy between plant abundance models that were developed locally and extrapolated regionally, and those that were developed regionally and extrapolated locally. A key spatial data layer in the analysis was LANDFIRE Existing Vegetation Type.</p>
<p><i>Colorado: The Projected Increase in the Spread of Bark Beetle Diseases Due to a Warming of the Climate and a Decrease in Host Tree Defenses</i></p> 	<p>Temperli et al. looked at several factors involving bark beetle outbreaks, including the nature of the environment, beetle species, and the effects of climate change. LANDFIRE EVT data support their advice to consider climate-driven shifts in forest and disturbance dynamics when devising adaptive management strategies.</p>






<p><i>Colorado: State Forest Assessment</i></p> 	<p>Colorado State Forest Service contracted with The Nature Conservancy's Colorado Chapter to aid in the development of its Statewide Forest Assessment. An interagency, interdisciplinary team identified data needs and reviewed and selected the best available data sources. All analyses regarding vegetation types were based on LANDFIRE vegetation data. To assess current forest conditions, the team used the LANDFIRE Fire Regime Condition Class Departure index. Data indicated that of the state's 24.4m acres of forests and woodlands, forest types on 6.8 million acres are significantly departed from expected reference conditions. The land management practice of virtually excluding fire from the landscape for more than a hundred years is the primary cause for departure.</p>
<p><i>Colorado: Upper Monument Creek Forest Planning</i></p> 	<p>The Nature Conservancy in Colorado, collaborating with the Pike San Isabel National Forest, is using Landscape Conservation Forecasting concepts to explore the current status of major vegetation ecosystems on the 70,000-acre Upper Monument Creek (UMC) planning area in the Pike Ranger District. To provide a foundation for the work, LANDFIRE models were adapted to reflect historic conditions in the UMC watershed. Because the 2012 Waldo Canyon fire occurred in this region, the impacts of that fire on current vs. desired future conditions will be in the mix.</p>
<p><i>Colorado Wildfire Risk Assessment Portal (CO- WRAP)</i></p> 	<p>CO-WRAP is a web-mapping tool that provides access to statewide wildfire risk assessment information. Through CO-WRAP, wildfire mitigation/prevention planners and interested citizens can generate maps and download data and reports that describe defined project areas or areas that may require additional planning. LANDFIRE 2008 (V1.1.0) surface fuels (FBFM) and EVT layers were utilized in the project.</p>
<p><i>Colorado: Wildland Fire Decision Support System</i></p> 	<p>The Wildland Fire Decision Support System (WFDSS) helps fire managers and analysts make strategic and tactical decisions for wildland fire incidents. WFDSS combines various incident management applications into a single system, thus streamlining the analysis and reporting processes. LANDFIRE fire behavior fuel model layers support the WFDSS when local data are not available.</p>
<p><i>Hawai'i: Assessment & Resource Strategy Analysis</i></p> 	<p>The Hawai'i Department of Forestry and Wildlife developed its Statewide Assessment of Forest Conditions and Resource Strategy in 2010, and LANDFIRE data sets were key resources in the effort. For each of the nine issues that stakeholders examined, trends, existing conditions, threats and benefits for forests and treed landscapes were characterized. Partners created maps and developed a set of strategies to address their concerns. The project resulted in the Assessment and the development of a 5– to 10–year resource strategy.</p>






<p><i>Hawaii: Watershed Conservation Efforts on the Big Island of Hawaii and its Benefit-Cost Relationship</i></p>		<p>In a cost-benefit analysis, Burnett et al. examined the relationship between forest structure and composition and freshwater assets in several nature preserves in Hawaii where native forests are being taken over by non-native species that contribute to higher evapotranspiration rates and lower canopy water storage than native species do. As a result, there is lower net precipitation, and efforts to support conservation and restoration are costly. LANDFIRE vegetation data were used in the analysis.</p>
<p><i>Idaho: Assessing Sage Grouse Habitat Restoration</i></p>		<p>Arkle et al. (2014) assessed sage grouse habitat and habitat restoration using LANDFIRE Existing Vegetation Type data, plot samples and other biophysical setting data (e.g., elevation). Authors found that sage grouse populations were positively associated with dwarf and big sagebrush steppe, and negatively associated with non-native plants and human development. Post-fire restoration did not benefit sage grouse habitat and authors suggest it may take more than 20 years post-fire recovery for habitat to be suitable. Protection of current suitable habitat, limiting non-native plants, and minimal human development appear to be the best strategies for sage grouse conservation.</p>
<p><i>Idaho: Clearwater Basin Collaborative Landscape Assessment</i></p>		<p>A group of conservation, business, government, and tribal leaders in northern Idaho are working together through the Clearwater Basin Collaborative (CBC) to resolve longstanding land management conflicts. The CBC Landscape Assessment used LANDFIRE data to summarize current ecological forest conditions throughout the Basin, and across all ownerships and management allocations. The assessment findings support the development of a shared vision for forest management activities, help define management needs, and provide ecological context for CBC conversations on forest management.</p>
<p><i>Idaho: Forests Restoration Needs Assessment</i></p>		<p>The Idaho Forest Restoration Needs Assessment evaluated landscape-scale forest restoration needs using LANDFIRE data inputs.</p>
<p><i>Idaho: Observing Raven Populations Due to Livestock Presence in Sagebrush Habitat with Sage-Grouse Protection Concerns</i></p>		<p>Coates et al. looked at how grazing livestock affects raven populations in a sagebrush ecosystem and considered other landscape characteristics that affect this predator bird. The study observed how raven populations negatively impact declining populations of greater sage-grouse, their habitats, and their newborns. LANDFIRE provided underlying land cover data.</p>







<p><i>Idaho: Payette National Forest Bighorn Sheep Viability Analysis</i></p> 	<p>In response to a Forest Plan appeal reversal by the Washington Office in 2005, the Payette National Forest (PNF) completed an assessment and a report of a plan designed to maintain habitat for viable populations of bighorn sheep. LANDFIRE's Existing Vegetation Type and canopy cover data provided the spatial extent and scale needed to complete this analysis of the Hell's Canyon and the PNF areas, and allowed for a view of bighorn sheep habitat far beyond the PNF boundary. The broader view allows the team to look at the possible vectors of disease transmission to and from bighorn sheep herds both on and near the forest.</p>
<p><i>Idaho: Updating LANDFIRE Fuel Grids Using MTBS Fire Severity Data</i></p>	<p>This project updated LANDFIRE 2012 fuels data layers to a 2015 condition within the South Central Idaho Fire Planning Unit. The area needed attention because of changes due to four large fires that occurred in 2013. The authors replicated the LANDFIRE update process by using Monitoring Trends in Burn Severity (MTBS) data, ArcGIS tools and the LANDFIRE Total Fuel Change Tool.</p>
<p><i>Idaho: Woodpecker Occupancy Modeling</i></p> 	<p>Cavity excavators can be ecosystem engineers with implications for birds, mammals, insects and fungi. Baumgardt et al. (2014) modeled woodpecker occupancy using, among other datasets, LANDFIRE canopy cover and canopy height data. This paper demonstrates two useful techniques when working with LANDFIRE data: 1) updating using local data, and 2) collapsing categories to better meet needs of study. Additionally, several datasets representing multiple scales were combined to best capture occupancy and demonstrate potential modeling methods for these important indicators of forest biodiversity.</p>
<p><i>Illinois: Fire Needs Assessment</i></p> 	<p>The Illinois Prescribed Fire Council developed the state's fire needs assessment to promote and expand the use of prescribed fire across the state. This is the first systematic report in Illinois to document the number of acres burned annually and identify how many need to burn in order to promote ecosystem health. It provides a call to action for land managers, legislators and the public. LANDFIRE datasets BpS, EVT, and MFRI were foundational resources.</p>
<p><i>Illinois: Landscape Change Driven by Biofuels Mandate</i></p> 	<p>LANDFIRE data were used to project the potential impacts, including a substantial increase in production of corn, of the biofuel mandate targets set by the 2007 Energy Independence and Security Act. Details are available in the report "Midwest U.S. landscape change to 2020 driven by biofuel mandates," in <i>Ecological Applications</i>. 22(1): 8–19. 2012. Authors are M. Mehaffey, E. Smith and R.V. Remortel.</p>
<p><i>Iowa: Ecosystem Services in the Midwest</i></p> 	<p>LANDFIRE existing vegetation data were used to assess ecosystem services in Midwest. Read the paper "Developing a dataset to assess ecosystem services in the Midwest United States" in the <i>International Journal of Geographical Information Science</i>. 25(4): 681-695. 2011. Authors are M. Mehaffey, R. Van Remortel, E. Smith, and R. Bruins.</p>





<p><i>Kansas: Using State-and-Transition Models to Simulate Large-Scale Changes in Land Use and the Impacts on Ecosystem Carbon Dynamics Under a Range of Future Global Change Scenarios</i></p> 	<p>Data and models were developed to provide spatial and ecoregional-scale projections of land-use change and how those changes might impact terrestrial carbon stocks. Numerous national-scale datasets were leveraged and integrated into a state-and-transition model to project future changes in land use, land cover, ecosystem composition, and carbon dynamics, under a wide range of future socioeconomic and climate-change scenarios. LANDFIRE support in the development of the SyncroSim modeling platform was a key component of this analysis.</p>
<p><i>Maine: Appalachian Trail Decision Support System</i></p> 	<p>In the paper Development of a Decision Support System for Monitoring, Reporting, and Forecasting Ecological Conditions of the Appalachian Trail, Wang and others discuss a multi- agency effort to create a MEGA-Transect Decision Support System designed to monitor, report and forecast conditions along the Appalachian Trail. The habitat monitoring and modeling component of the system uses LANDFIRE Existing Vegetation Type, Cover, Height and succession.</p>
<p><i>Massachusetts: Barnstable County Wildfire Preparedness Plan on Cape Cod Island</i></p> 	<p>This county fire preparedness plan was developed to assess wildfire risk in Barnstable County, MA. Several LANDFIRE 2008 datasets were used, including Mean Fire Return Interval, Scott and Bergan's 40 Fire Behavior Fuel Models, slope, aspect, elevation, canopy base height, canopy bulk density, canopy cover and canopy height.</p>
<p><i>Massachusetts: National Biomass and Carbon Dataset</i></p> 	<p>Scientists at Woods Hole Research Center created a high-resolution National Biomass and Carbon Dataset for the year 2000, the first-ever spatially explicit inventory of its kind. The dataset was produced as part of a project funded under NASA's Terrestrial Ecology Program with additional support from LANDFIRE. The project has generated a 30m resolution, year 2000 baseline estimate of basal area-weighted canopy height, above-ground live dry biomass, and standing carbon stock for the conterminous U.S.</p>
<p><i>Michigan: Ecological Conservation Risk of the Conterminous U.S</i></p> 	<p>In their paper Accounting for Ecosystem Alteration Doubles Estimates of Conservation Risk in the Conterminous United States, Swaty and others used LANDFIRE's Vegetation Condition Class map in combination with other datasets to assess the conservation risk of the ecoregions of the conterminous U.S.</p>
<p><i>Michigan: Eliciting Expert Knowledge to Inform Landscape Modeling of Conservation Scenarios</i></p> 	<p>Price and others used LANDFIRE vegetation dynamics models and land cover data to model alternative scenarios of land cover change and conservation outcomes in forests of the northern Great Lakes region. The study, Eliciting expert knowledge to inform landscape modeling of conservation scenarios, was designed to help inform current and future forest conservation efforts.</p>






<p><i>Michigan: Forest Scenarios - Two Hearted River Site</i></p> 	<p>The Nature Conservancy in Wisconsin collaborated with the University of Wisconsin–Madison to develop a modeling project that tested the potential effectiveness of conservation strategies, both with and without projected climate change scenarios. The collaborators used LANDFIRE Vegetation Dynamics Development Tool models and spatial data as the foundation for scenario modeling efforts.</p>
<p><i>Michigan: Forest Scenarios - Wild Rivers Legacy Forest Site</i></p> 	<p>The Nature Conservancy in Wisconsin collaborated with the University of Wisconsin–Madison to develop an expert-and data-based modeling project whose objective was to test the potential effectiveness of conservation strategies, both with and without projected climate change scenarios. The collaborators used LANDFIRE Vegetation Dynamics Development Tool models and spatial data as the foundation for scenario modeling efforts.</p>
<p><i>Michigan: Hiawatha National Forest Planning</i></p> 	<p>The Hiawatha National Forest and The Nature Conservancy have been using LANDFIRE tools and data to complete a Community Wildfire Protection Plan. The purpose is to develop descriptions of land type associations and to inform current climate change and fire planning efforts.</p>
<p><i>Michigan: Insights on Permanent Food Storage Infrastructures, Socioeconomic Status, Society, and Landscape Considerations in Northern Michigan</i></p> 	<p>Howey and Frederick studied cache-pits and other non-removable food storage units in the late pre-contact period (1100-1600 AD) of egalitarian, low-density, hunter-gatherer societies in the Douglas/Burt Lake area of Northern Michigan. Authors used LANDFIRE's Biophysical Settings data to get an estimate of the landcover during that period.</p>
<p><i>Minnesota: Are Investments to Promote Biodiversity Conservation and Ecosystem Services Aligned?</i></p> 	<p>Polasky et al. provide an important examination of environmental protection activities designed primarily for land and water vis-a-vis environmental protection designed primarily for people. The authors used LANDFIRE Biophysical Settings data along with several other datasets to evaluate both scenarios. The findings show that protecting land for human benefit provides commensurate benefit to biodiversity, and that protecting land and water for the sake of biodiversity can result in clear human benefit as well.</p>
<p><i>Montana: Development of the Rangeland Vegetation Simulator</i></p> 	<p>The Rangeland Vegetation Simulator was developed as a research tool enabling projections of future vegetation conditions and as a decision support tool enabling land management agencies to more accurately describe post-disturbance successional dynamics and estimate wildland fire behavior and effects. LANDFIRE's BpS data provide much of the ecological foundation of the model.</p>






<p><i>Montana: The Effect of Converting Wild Sagebrush Environments to Agricultural Land and its Effect on the Threatened Sage Grouse Population</i></p> <ul style="list-style-type: none"> ❖ Eastern Montana, northeastern Wyoming, North Dakota and South Dakota 	 <p>Much of the northwest United States has been converted from wild shrubland areas to cropland areas. These shrubland areas include sagebrush which is a desirable habitat for the sage-grouse. The sage grouse was added to the Endangered Species Act (ESA) candidate list in 2010. Using LANDFIRE existing vegetation type data, Smith et al. determined how new cropland can affect the breeding of the sage grouse and show how conservation easements can positively affect the long-term outcome of the grouse.</p>
<p><i>Montana: Examining the Effects of Climate Change on Cattle Production in Seven Different Regions of Rangelands in the Western US</i></p> <ul style="list-style-type: none"> ❖ Southwest, Desert Southwest, the Interior Mountain West, the Great Basin, Northern Great Plains, Southern Great Plains, and the Eastern Prairies 	 <p>This study by Bagne and Reeves projects, to the year 2100, the effect of climate change on seven major rangelands in the United States: the Southwest, Desert Southwest, the Interior Mountain West, the Great Basin, Northern Great Plains, Southern Great Plains, and the Eastern Prairies. Using LANDFIRE existing and potential vegetation data, they examine four aspects related to projected climate change and its effect on cattle production: forage quantity and variability, the number of heat-stress days, and vegetation</p>
<p><i>Montana: Extent of Conterminous US Rangelands</i></p>	 <p>Reeves and Mitchel mapped the extent of rangelands according to the National Resources Inventory and Forest Inventory and Analysis definitions, and used unmodified LANDFIRE 2001 Existing Vegetation Type, Existing Vegetation Cover, Existing Vegetation Height, and Biophysical Settings data to provide a reliable estimate of the extent of rangelands in the U.S. The results are valuable for estimating carbon sequestration and forage availability, providing a baseline for measuring change in rangeland extent over time, and supporting development of management and monitoring plans.</p>
<p><i>Montana: Fire Management in the National Wildlife Refuge System - A Case Study of the Charles M. Russell National Wildlife Refuge</i></p>	 <p>Reid and Fuhlendorf (2011) examined the fire regime of the Charles M. Russell National Wildlife Refuge over the previous 28 years and compared it to historical fire regime reconstructions using LANDFIRE National Fire Regime Condition Class, Fire Regime Group, and Mean Fire Return Interval layers. By comparing the refuge records to what was available through LANDFIRE, they determined that a large majority of the refuge was moderately or highly departed from the historic fire regime. The average mean fire return interval for the refuge based on LANDFIRE reconstructions was 48 years compared to 134 years as calculated based on refuge records from 1980-2008.</p>
<p><i>Montana: Fire Regime Syntheses</i></p>	 <p>The Fire Effects Information System's Fire Regime Syntheses provide managers and planners with scientifically sound, up-to-date information on historical fire regimes based on the scientific literature and LANDFIRE Biophysical Settings models and descriptions. The syntheses present current information on historical fire frequency, spatial pattern, extent, and seasonality; historical natural and human-caused ignition sources; and typical patterns of fire intensity and severity. They also provide information on contemporary changes in fuels, especially in relation to their potential to influence fire regimes.</p>





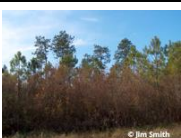

<p><i>Montana: Identifying Common Patterns in Diverse Systems: Effects of Exurban Development on Birds of the Adirondack Park and the Greater Yellowstone Ecosystem, USA</i></p>	 <p>© Mark Godfrey/The Nature Conservancy</p>	<p>Glennon et al. examine the impact of exurban development on avian communities in two distinct areas and found similar patterns in both the Greater Yellowstone Ecosystem and the Adirondacks of New York. LANDFIRE data were used to determine forest types and cover categories in order to hypothesize what types of birds would be found in each testing area and how exurban development might contribute to changes that affect avian communities. Both areas had lower relative abundance of neotropical migrant groups and an increase in edge-specialist birds in the suburban areas, indicating that human behavior and land development are underestimated forces that drive change in avian communities.</p>
<p><i>Montana: Northern Divide Grizzly Bear Project</i></p>	 <p>Ben Thomas/The Nature Conservancy</p>	<p>The Northern Continental Divide grizzly bear population in northwest Montana is one of six threatened populations identified in the US Fish and Wildlife Service's Grizzly Bear Recovery Plan. The primary objectives of the Northern Divide Grizzly Bear Project were to develop a statistically rigorous estimate of grizzly bear population size and assess variation in the density of bears. LANDFIRE data supported multi-scale analysis at an appropriate resolution and scale, and provided land managers with sound information to map and evaluate grizzly bear habitat quality.</p>
<p><i>Montana: Remote Sensing Rangeland Assessment</i></p>	 <p>© Mark Godfrey</p>	<p>Reeves and Baggett (2014) developed methods for comparing current conditions of rangelands to modeled reference conditions. Using LANDFIRE Existing Vegetation Type and other data, they estimated vegetation productivity and found that 16% of the rangelands in the northern and 9% of the rangelands in the southern Great Plains were degraded. However, levels of degradation result in less than 1% loss in total annual net primary productivity.</p>
<p><i>Montana: Wildland Fire Potential Map</i></p>	 <p>© USDA Forest Service</p>	<p>The map of wildland fire potential (WFP) produced by the USDA Forest Service Fire Modeling Institute depicts the relative potential for wildfires that would be difficult to suppress. The 2012 WFP map was based on past fire occurrence, 2008 fuels data from LANDFIRE, and 2012 estimates of wildfire likelihood and intensity from FSim. The map and data can be used to support wildfire risk assessments or hazardous fuel treatment prioritization efforts across large landscapes.</p>
<p><i>Montana: Working towards an Ecologically-Friendly Viewpoint of Forest Fires</i></p>	 <p>© The Nature Conservancy/Chris Helmer</p>	<p>Hutto et al. use the historical presence of high-severity fire patches in mixed-conifer forests of the western U.S. to make several points that support a more ecologically informed view of severe wildland fire effects. The authors looked at the evolution of animal and plant species in burned forest conditions, fire history in the West, and post-fire forest integrity, and suggested altering public service messaging around fire. LANDFIRE data helped determine fire severity across vegetation types and biophysical settings.</p>





<p><i>Nebraska: Future Grassland Productivity and Biofuels for Greater Platte River Basin</i></p>		<p>In this study, Yingxin Gu et al. projected future (2050 and 2099) grassland productivities in the Greater Platte River Basin by using ecosystem performance models (a surrogate for measuring ecosystem productivity) and future climate projections. LANDFIRE National Environmental Site Potential data were among the multiple components that were used to estimate ecosystem site potential.</p>
<p><i>Nevada: Central Basin and Range Rapid Ecoregional Assessment</i></p>		<p>The Bureau of Land Management and NatureServe conducted a Rapid Ecoregional Assessment for the Central Basin and Range Ecoregion in Nevada and Utah, an area that covers 120,000 square miles, and includes all or portions of 16 BLM field offices. LANDFIRE products, including vegetation sample data, vegetation type, fuel model and fire regime maps, and vegetation dynamics models were combined to look at the ecoregion's current conditions and to help determine how the agency can respond to ongoing environmental changes and land use demands.</p>
<p><i>Nevada: Great Basin National Park Landscape Conservation Forecasting</i></p>		<p>The Landscape Conservation Forecasting "CAP" method was used by The Nature Conservancy's Nevada Chapter and local stakeholders to evaluate the costs and benefits of alternative management scenarios for the Great Basin National Park. LANDFIRE biophysical settings models were the starting point for ecological explorations into the Park's vegetation systems.</p>
<p><i>Nevada: Greater Sage-Grouse Characteristics and Dynamics</i></p>		<p>LANDFIRE Existing Vegetation data were used in support of a Greater Sage-Grouse study by Connelly and others that evaluated the ecology and conservation interactions for sage-grouse and sagebrush spatial patterns. Connectivity analysis provided a framework for quantifying the range-wide pattern of sage-grouse populations that integrated landscape arrangement of habitat and populations, population dynamics within components, and exchange of sage-grouse individuals among leks and components. Read the LANDFIRE Summary.</p>
<p><i>Nevada: North Schell Creek Conservation Planning</i></p>		<p>A team at Nevada's North Schell Creek Range devised an innovative approach to setting priorities that helps facilitate the public review process. Combining The Nature Conservancy's Conservation Action Planning framework, LANDFIRE data and analysis products, and a novel return on investment tool, the project team generated a large volume of scientifically defensible documentation that was used during the review process.</p>
<p><i>Nevada: South Spring and Hamblin Valleys Conservation Planning</i></p>		<p>The Ely district of the Bureau of Land Management used LANDFIRE data in Evaluation Reports that are aimed at evaluating resource conditions' status. Specifically, they depended on LANDFIRE's Fire Regime Condition Class (Vegetation Condition Class) to assess ecological conditions in the watershed management units.</p>





<p><i>New Mexico: Signal Peak Fuels Prioritization and Planning</i></p>		<p>The Signal Peak Assessment prioritized treatment across a 360,000-acre landscape in southwest New Mexico that included U.S. Forest Service, Bureau of Land Management, and state and private ownership. The goal of the assessment was to identify areas for treatment that would simultaneously reduce the risk of wildfire to communities and restore fire-adapted ecosystems. LANDFIRE provided the only continuous, consistent maps of multiple related data products (including vegetation, fuels, and environmental information) that covered all lands within the assessment area.</p>
<p><i>New Mexico: Upper Mimbres Watershed Assessment</i></p>		<p>The Nature Conservancy's New Mexico Chapter conducted a rapid landscape-scale assessment of the Upper Mimbres Watershed in southwest New Mexico in order to provide a foundation for developing a collaborative fire management plan. Using LANDFIRE data on the 535,000-acre, multi-ownership area, the team calculated fire regime condition class and modeled potential fire behavior. The Silver City and Wilderness Ranger Districts are using some of the results in the Healthy Forest Restoration Act Environmental Assessment for the 125,000-acre Upper Mimbres area, focusing on prescribed fire, fuel reduction, and riparian restoration treatments.</p>
<p><i>New York: Assessing Forest Ecological Integrity Using LANDFIRE and Forest Inventory Analysis</i></p>		<p>Assessing the current ecological integrity of a site or landscape requires measures of structure, composition and function, NatureServe has developed a rigorous and adaptable Forest Ecological Integrity Assessment (FIA) that describes the methods and linkages to LANDFIRE spatial datasets and vegetation models.</p>
<p><i>New York: Identifying Common Patterns in Diverse Systems - Effects of Exurban Development on Birds of the Adirondack Park and the Greater Yellowstone Ecosystem, USA</i></p>		<p>Glennon et al. examine the impact of exurban development on avian communities in two distinct areas and found similar patterns in both the Greater Yellowstone Ecosystem and the Adirondacks of New York. LANDFIRE data were used to determine forest types and cover categories to hypothesize what types of birds would be found in each testing area and how exurban development might contribute to changes that affect avian communities. Both areas had lower relative abundance of neotropical migrant groups and an increase in edge-specialist birds in the suburban areas, indicating that human behavior and land development are underestimated forces that drive change in avian communities.</p>






<p><i>North America Coastal Plain: How Global Biodiversity Hotspots May Go Unrecognized</i></p>		<p>This case study of the North American Coastal Plain (NACP) underscores the under-representation of certain regions as global conservation priorities. With the efforts of the authors and others, ancient, fire-dependent biomes with high endemism of herbaceous plants and associated animals are becoming recognized as biologically significant. The authors theorize that paltry information and systematic biases and misconceptions about biogeographic history obscure the existence of other conservation-significant regions world-wide. LANDFIRE's data set allowed consistent estimates of historic fire regimes and of vegetation loss across the NACP region.</p>
<p><i>North Carolina: An Assessment of the Nantahala- Pisgah National Forest and Surrounding Lands: A Synthesis of the eCAP Methodology and LiDAR Vegetation Analysis</i></p>		<p>The project provided a comparison between current vegetation conditions and desired future conditions, highlighting the management needs of 10 major ecosystems of global conservation significance in a 1.7 million-acre study area. Locally modified LANDFIRE Biophysical Settings models were used as the ecological framework for the assessment.</p>
<p><i>North Carolina: Evaluating Management Scenarios for Atlantic Coastal Plain Pocosin Soils</i></p>		<p>The North Carolina Chapter of The Nature Conservancy and partners modified LANDFIRE state-and-transition models and used them to explore management options for restoring longleaf flatwoods, longleaf savannas, and pocosins.</p>
<p><i>North Carolina: GAP Analysis- National Inventory of Vegetation and Land Use</i></p>		<p>In their study Linking state-and-transition simulation and timber supply models for forest biomass production scenarios, Costanza et al. linked state-and-transition simulation models (STSMs) with an economics-based timber supply model to examine landscape dynamics in North Carolina through 2050 for three scenarios of forest biomass production. Forest biomass could be an important source of renewable energy in the future, but there is uncertainty about how biomass production would impact landscapes. LANDFIRE provided the initial STSMs.</p>
<p><i>Ohio: Wildfire Hazard Mapping: Exploring Site Conditions in Eastern U.S. Wildland-Urban Interfaces</i></p>		<p>The authors created monthly wildfire ignition probability maps from environmental predictors and wildfires that occurred between 2000 and 2009 for New Jersey, Ohio, and Pennsylvania. Predictor variables included a drought index, long-term soil moisture, percentage forest (from LANDFIRE's Existing Vegetation Type data), and wildland- urban interface classifications. Report results suggest that monthly hazard assessments provide a better indication of potential wildfires than does a single mean annual probability.</p>







<p><i>Oregon: A New Approach to Evaluate Forest Structure Restoration Needs Across Oregon and Washington</i></p>		<p>In this study, Haugo et al. demonstrate a new approach for evaluating where, how much, and what types of restoration are needed to move present day landscape scale forest structure towards a Natural Range of Variability (NRV) across eastern Washington, eastern Oregon, and southwestern Oregon. The approach builds on the conceptual framework of the LANDFIRE and Fire Regime Condition Class programs. It was found that changes in current structure would be needed on an estimated 4.7 million+ ha (40% of all coniferous forests) in order to restore forest structure approximating NRV at the landscape scale.</p>
<p><i>Oregon: Assessing Federal Forests' Procedures on Wildfire Risk in the Pacific Northwest</i></p>		<p>Ager et al. analyzed the impact of amenity and biodiversity protection as mandated in national forest plans on the implementation of hazardous fuel reduction treatments aimed at protecting the wildland urban interface (WUI) and restoring fire resilient forests. They modeled wildfire risk transmission, management and forest restoration in the Pacific Northwest using LANDFIRE fuel and fire regime data.</p>
<p><i>Oregon: Climate Change and Salmonids</i></p>		<p>Percent canopy cover information provided by LANDFIRE contributed to a study by Aaron Ruesch et al. that investigated climate-induced changes in summer thermal habitat for three cold-water fish species: juvenile Chinook salmon, rainbow trout, and bull trout in the John Day River basin in Oregon.</p>
<p><i>Oregon: Development of a New Restoration Optimization System and Demonstration on a National Forest in Oregon</i></p>		<p>Vogler et al. highlight the development of a new fire restoration approach in a national forest in northeastern Oregon by increasing fire resiliency, informing public land managers, and protecting ecosystem services. At the same time, this article recognizes certain tradeoffs that can occur, especially in forest restoration goals and economic activity such as timber sales.</p>
<p><i>Oregon: Forests and Woodland Conservation Analysis</i></p>		<p>The Nature Conservancy's Oregon Chapter used LANDFIRE's vegetation condition class and fire regime maps to evaluate the scope of restoration needed to restore Oregon's fire-adapted forests and woodlands. The report indicates that over the next 20-25 years the estimated annual rate of treatment needed on public lands to address uncharacteristic fuel loads, restore fire as a natural process, and reduce fire risk in the Wildland Urban Interface (WUI) is three to four times greater than current agency treatment rates. Their estimates also called attention to restoration needs outside the WUI and highlighted the need for a statewide strategy that would take a comprehensive approach to solving the problem.</p>






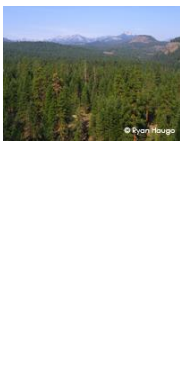
<p><i>Oregon: Future Scenarios of Land Use and Land Cover Change in the U.S.</i></p>		<p>Projecting future changes in land use/cover requires an understanding of the rates and patterns of change, the major driving forces, and the socio-economic and biophysical determinants and capacities of regions. The data presented in this report are the result of an effort by USGS scientists to downscale the Intergovernmental Panel on Climate Change (IPCC) Special Report on Emission Scenarios (SRES) to ecoregions of the conterminous U.S. as part of the USGS Biological Carbon Sequestration Assessment. Spatially explicit data from LANDFIRE and modified vegetation models were utilized in the analysis.</p>
<p><i>Oregon: Lakeview Restoration and Prioritization Analysis</i></p>		<p>The Lakeview Stewardship Group used a “values mapping exercise” to develop a spatially explicit set of priority treatment areas that would help preserve large or old-growth trees and restore healthy forest conditions. LANDFIRE forest height, forest cover, fire regime condition class, and reference condition data were used in conjunction with other datasets to inform the values mapping process.</p>
<p><i>Oregon: Northwest Restoration Needs Assessment</i></p>		<p>The northwest restoration needs assessment is a joint project between The Nature Conservancy and the USFS Pacific Northwest Region that addresses actions that are needed to restore forested lands in Oregon and Washington. LANDFIRE BpS models were used along with regional datasets to complete the analysis. The study, A New Approach to Evaluate Forest Structure Restoration Needs Across Oregon and Washington by Haugo et al. (2015) is published in <i>Forest Ecology and Management</i>.</p>
<p><i>Oregon: Regional Carbon Dioxide</i></p>		<p>LANDFIRE spatial products were combined with Forest Inventory and Analysis (FIA) plots and other databases to provide new estimates of U.S. West Coast forest biomass carbon stocks, net ecosystem production, net biome production, and their attendant uncertainties.</p>
<p><i>South Carolina: Modeling Vegetation Dynamics and Habitat Availability in the Southeastern U.S.</i></p>		<p>The Southeast Gap Analysis Project used LANDFIRE Vegetation Dynamics Development Tool (VDDT) models as the starting point for vegetation dynamics models. The models were then modified to incorporate contemporary fire probabilities and the potential future influence of climate change on fire probabilities. Finally, models that represent urban, agricultural, and managed forest lands were added. The project produced wall-to-wall, spatially explicit projections of vegetation and land use dynamics in response to multiple climate change scenarios through time.</p>
<p><i>South Dakota: Fuel Treatment Effectiveness</i></p>		<p>A methodology for combining data from LANDFIRE and Monitoring Trends in Burn Severity (MTBS) with spatial data on fuel treatment locations was developed to quantify treatment effects on burn severity. In Assessing fuel treatment effectiveness using satellite imagery and spatial statistics, Wimberly et al. analyze three fires that occurred in different ecosystems.</p>





<p><i>Southeast United States: Dougherty Plain Ecoregion (Georgia, Alabama, Florida Panhandle</i></p>		<p>Using state-and-transition simulation modeling based on LANDFIRE biophysical settings, Costanza et al. used scenarios of climate change, urbanization, and management to simulate the future dynamics of the critically endangered and fire-dependent longleaf pine (<i>Pinus palustris</i>) ecosystem. In addition to investigating how climate change and urbanization would affect the ecosystem, the authors examined whether two conservation goals (135% increase in total longleaf area and a doubling of fire-maintained open-canopy habitat) are achievable in the face of these drivers. Results indicate that both conservation goals are only attainable if a greater focus is placed on restoration of non-longleaf areas as opposed to maintaining existing longleaf stands.</p>
<p><i>Tennessee: Cherokee National Forest Collaborative Restoration Planning</i></p>		<p>A group of stakeholders coordinated by the Tennessee Chapter of The Nature Conservancy completed an analysis of management options for the North District of the Cherokee National Forest. The process combined local ecological knowledge and spatial data with LANDFIRE spatial data and modified LANDFIRE vegetation models. The analysis resulted in consensus regarding best management approaches for the District.</p>
<p><i>Texas: Army National Guard Project Prioritization</i></p>		<p>LANDFIRE Existing Vegetation Type, Fire Return Interval and vegetation departure products were used in a GIS analysis to assist in land management planning on TX Army National Guard land. The analysis helped Natural Resource personnel identify areas on the training center where brush management (by mechanical or herbicide application) could improve land quality by increasing the effectiveness of prescribed fire or substitute where prescribe fire is ineffective. These products were combined with other information to identify priority areas where land managers could target and prioritize brush management projects.</p>
<p><i>Texas: Army National Guard Training Area Management Program</i></p>		<p>Texas Army National Guard Integrated Training Area Management Program (ITAM) has the responsibility to sustain good land condition on troop training areas. LANDFIRE data and maps are being integrated with regional data for climate change, hydrology, vegetation conditions, erosion conditions, fire issues, past land conditions, condition monitoring analysis from yearly ITAM monitoring and soil maps to plan and implement sustainability of four widely separated central Texas training sites of a total 35,000 acres.</p>




<p><i>Texas: Chihuahuan Desert Grassland Bird Habitat Relationships and Abundance</i></p>		<p>Rocky Mountain Bird Observatory (RMBO) developed habitat-specific relationships to bird density for the Grassland Priority Conservation Areas in the U.S. and Mexico (see Chihuahuan Desert Grassland Bird Conservation Plan and Wintering Grassland Bird Densities in Chihuahuan Desert Grassland Priority Conservation Areas). Using program distance plus available GIS data from LANDFIRE and <i>Instituto Nacional de Estadística y Geografía</i>, corrected by RMBO site verification data, the RMBO estimated density and population size for many of the most common passerine grassland bird species wintering in the Chihuahuan Desert. Results can be used for Federal, State, and non-governmental organizational planning and management programming.</p>
<p><i>Utah: Assessing Riparian Vegetation Condition for Very Large Landscapes in the North American West</i></p>		<p>Riparian ecosystems support unique vegetation communities are a critical ecological community in nearly every landscape, so it is important to evaluate their health for effective planning. MacFarlane et al. provide an approach that uses nationally available, existing land cover classification data for all lands available from the LANDFIRE program, estimated to be to be 85% accurate based on comparison to field locations. The approach was applied across Utah, and provided state-wide riparian condition maps that will help resource managers better prioritize sites and treatments for reach-scale conservation and restoration activities.</p>
<p><i>Utah: Carbon Biomass</i></p>		<p>Forest Inventory and Analysis (FIA) data, Landsat, and LANDFIRE data were integrated in a statistical model designed to estimate aboveground forest biomass carbon at a 30-meter resolution in the Utah High Plateaus.</p>
<p><i>Utah: Developing Site-Specific Nutrient Criteria from Empirical Models</i></p>		<p>Ecologically meaningful and scientifically defensible nutrient criteria are needed to protect the water quality of U.S. streams. By setting and using criteria based on the best understanding of naturally occurring nutrient concentrations, resource managers can take steps to protect both water quality and aquatic biota. The authors developed Random Forest models to predict how baseflow concentrations of total P (TP) and total N (TN) vary among western streams in response to continuous spatial variation in nutrient sources, sinks, or other processes affecting nutrient concentrations. LANDFIRE BpS descriptions and the Version 1.0.5 BpS layer were part of the data suite used in this analysis.</p>

<p><i>Utah: Environmental Filtering, Niche Partitioning, and Riparian Guilds (Interior Columbia and upper Missouri River basins)</i></p>		<p>Identifying the environmental filters that exert selective pressures and favor specific vegetation guilds within riverscapes is a critical step in setting baseline expectations for how riparia may respond to future global change scenarios. Using LANDFIRE data to estimate the proportion of each watershed that had burned between 1997 and 2007, Hough-Snee et al. identified the proportion of each watershed and reach covered by overstory forest vegetation. The authors conclude that the riparian guild framework provides insight into how disturbance and bioclimatic gradients shape riparian functional plant diversity across heterogeneous landscapes.</p>
<p><i>Utah: Examining the Effect of Artificial Water Developments on Rodent Populations in a Cold Desert Climate</i></p>		<p>Artificial water developments are built in dry areas to increase species population and diversity, to encourage species movement, and to promote livestock grazing. Brian Kluever observed the indirect effects of artificial water developments on rodent population by using an observational method along with a before-after-control impact (BACI) method. The study was conducted in the Great Basin Desert with eight artificial water developments built from 1970-1990. LANDFIRE Existing Vegetation Type data were used to map dominant vegetation classes.</p>
<p><i>Utah: Fremont River Ranger District Landscape Conservation Forecasting</i></p>		<p>The Nature Conservancy in Utah, collaborating with the Dixie-Fishlake National Forest, used the concepts of Landscape Conservation Forecasting, developed in partnership with the LANDFIRE Program, to explore the current status of major vegetation ecosystems on the 500,000-acre Fremont Ranger District and a range of management options. Cost effective strategies for improving vegetation condition were identified.</p>
<p><i>Utah: Grouse Creek/Raft River Mountains Planning</i></p>		<p>The Nature Conservancy works with partners to improve land management in Utah's Grouse Creek and Raft River mountain ranges. One component of this work is using LANDFIRE's biophysical settings descriptions as benchmarks for restoration. LANDFIRE models and modeling software have been fundamental to the exploration of the potential effectiveness of various management scenarios.</p>
<p><i>Utah: Powell Ranger District Landscape Conservation Forecasting</i></p>		<p>The Nature Conservancy, collaborating with the Dixie-Fishlake National Forest, used the concepts of Landscape Conservation Forecasting (LCF) to explore the status of major vegetation ecosystems on the 375,000-acre Powell Ranger. The major issue identified was the over-abundance of late succession stages in aspen, mixed conifer forests and sagebrush systems. Cost-effective strategies for improving vegetation condition were identified. LANDFIRE helped develop the LCF methodology, and LANDFIRE data are frequently used in when applying the LCF process.</p>

<p><i>California: Wildland Fire Entrapment Avoidance: Modeling Evacuation Triggers</i></p>		<p>One potential tool for assisting fire managers in situations where human factors can hinder decision-making is the Wildland-Urban Interface Evacuation (WUIVAC) model. Utilizing multiple combinations of escape routes and fire environment inputs based on the 2007 Zaca fire, the authors created trigger buffers for firefighter evacuations in order to examine trigger buffer sensitivity to evacuation mode, and expected weather and fuel conditions. LANDFIRE spatial fuel data products were used to inform the process.</p>
<p><i>Virginia: Central Appalachians Forest Planning</i></p>		<p>The Nature Conservancy's Central Appalachians Fire Learning Network helped the National Forests of Virginia staff develop the George Washington National Forest Revised Forest Plan. LANDFIRE Biophysical Settings models and descriptions were used by the planners to investigate and identify Desired Future Conditions for the key ecosystems in the forest.</p>
<p><i>Virginia: Decadal RPA Assessment</i></p>		<p>The 2010 Resources Planning Act (RPA) Assessment summarizes results about the status, trends, and projected future of forests, rangelands, wildlife and fish, biodiversity, water, outdoor recreation, wilderness, and urban forests, as well as the potential impacts of climate change on these resources. Spatially-explicit vegetation data supplied by LANDFIRE, including Existing Vegetation Type, Existing Vegetation Height, Existing Vegetation Cover and Biophysical Settings, were used in the Assessment.</p>
<p><i>Virginia: Land Carbon Project</i></p>		<p>The LandCarbon Project seeks to develop and implement a methodology that estimates biological carbon pools and fluxes. The assessment covers all major terrestrial and aquatic ecosystems, is conducted for all 50 states, provides estimates of baseline as well as future potential carbon storage and greenhouse gas fluxes, and conducts analysis of effects of major natural and anthropogenic processes that impact ecosystem carbon storage and greenhouse gas fluxes. The LandCarbon project utilizes spatial data and vegetation transition information supplied by LANDFIRE.</p>
<p><i>Virginia: Rapid Assessment of U.S. Vegetation and Soil Organic Carbon Storage and Vegetation Carbon Sequestration Capacity</i></p>		<p>In order to develop a rapid assessment of biological carbon stocks and forest biomass carbon sequestration capacity in the conterminous United States, the U.S. Geological Survey turned to LANDFIRE National spatial products along with off-the-shelf maps and datasets for help. Working under a tight deadline in a short time frame, they could make estimates of stocks, sequestration capacity and more. The results can inform planners, frame discussions, and guide policies regarding reducing those levels.</p>
<p><i>Washington, DC: Forest as Ozone Abatement Strategy</i></p>		<p>The authors present a novel ozone abatement strategy: reforestation. To identify areas where reforestation might be most effective, the authors combined the forested vegetation types from LANDFIRE's Biophysical Settings data with areas currently identified in USGS data as shrub or herbaceous vegetation. This allowed them to find area where reforestation might be most plausible</p>

<p><i>Washington DC: Hazardous Fuels Reduction</i></p>		<p>The Ecosystem Management Decision Support System (EMDS) and Hazardous Fuels Prioritization and Allocation System (HFPAS) combine to create a system for allocating hazardous fuels reduction funds. LANDFIRE spatial data are important sources for EMDS/HFPAS.</p>
<p><i>Washington, DC: National Cohesive Wildland Fire Management Strategy</i></p>		<p>The National Cohesive Wildland Fire Management Strategy is a collaborative process seeking national, all-lands solutions to wildland fire management issues. The Cohesive Strategy further seeks the active involvement of all levels of government and non-governmental organizations, as well as the public in the process. LANDFIRE spatial data, representing “All Lands” were a key component of the Cohesive Strategy data analyses that informed the development of the regional and national strategies.</p>
<p><i>Washington: A New Approach to Evaluate Forest Structure Restoration Needs Across Oregon and Washington</i></p>		<p>In this study, Haugo et al. demonstrate a new approach for evaluating where, how much, and what types of restoration are needed to move present day landscape scale forest structure towards a Natural Range of Variability (NRV) across eastern Washington, eastern Oregon, and southwestern Oregon. The approach builds on the conceptual framework of the LANDFIRE and Fire Regime Condition Class programs. Across the analysis region it was found that changes in current structure would be needed on an estimated 4.7 million+ ha (40% of all coniferous forests) in order to restore forest structure approximating NRV at the landscape scale.</p>
<p><i>Washington: Carbon Dynamics of Forests in Washington</i></p>		<p>LANDFIRE Environmental Site Potential and Fire Severity data were used to explore the impact of changing age class distributions on carbon dynamics of forests in Washington State.</p>
<p><i>Washington: Carbon Stocks of Trees Killed by Bark Beetles and Wildfire in the Western U.S.</i></p>		<p>The objective of this carbon stocks study by Hicke et al. was to contribute to the understanding of forest carbon cycling by quantifying the amount of carbon in trees fires and bark beetles, in the western U.S. By combining existing spatial data sets of forest biomass, burn severity, and beetle-caused tree mortality, the authors estimated the amount of aboveground and belowground carbon in killed trees across the region. LANDFIRE Existing Vegetation Types effectively delineated distinct vegetation types that are meaningful suitability indicators for MPB-caused tree mortality.</p>
<p><i>Washington: Eastern Washington Forests “Whole Systems” Assessment</i></p>		<p>The Washington Chapter of The Nature Conservancy conducted a broad scale assessment of forest conditions in eastern Washington. The assessment is part of a “whole systems” approach designed to account for ecosystem processes and the needs of human communities while setting conservation goals. LANDFIRE’s biophysical settings, succession class, and reference conditions data were used to calculate Ecological Conditions in the study area. The paper An Ecological Context for Whole Systems Conservation of Eastern Washington Forests provides an overview of the process and presents key results.</p>

<p><i>Washington: Research to Regulation: Cougar Social Behavior as a Guide for Management</i></p>		<p>Cougar (<i>Puma concolor</i>) populations are a challenge to estimate because of low densities and the difficulty of marking and monitoring individuals. The authors of the study propose an organization that is designed to maintain an older age structure that should promote population stability. LANDFIRE habitat coverage data (2007) provided a foundation from which the authors quantified habitats used by marked cougars. As a result, they could recommend a hunter harvest that would be administered within zones approximately 1,000 km² in size so as to distribute harvests more evenly across the landscape.</p>
<p><i>Wisconsin: Comprehensive Forest Bird Data in Four National Forests of the Western Great Lake from 1995-2011</i></p>		<p>The western section of the Great Lake region, home to 200+ species of forest birds, has seen changes in its biodiversity in the last 150 years, especially with forest harvesting activity. In their study of forest birds in the Superior, Chequamegon-Nicolet, and Chippewa National Forests (1995-2011), Niemi et al. used a point-count method, performed mainly by experienced birders. Agricultural, industrial, and personal land use were noted as well. LANDFIRE Existing Vegetation Type data were used in the study.</p>
<p><i>Wisconsin: Fire Needs Assessment</i></p>		<p>To quantify and identify priority areas for prescribed fire, the Wisconsin Fire Needs Assessment combines the information for fire dependent vegetation with additional spatial data sets to assess the benefits, effort, and challenges associated with using prescribed fire. LANDFIRE data were used because they include both public and private lands; they are publicly available, making the methods easy to replicate for other states; and the assessment can be updated with future versions of LANDFIRE data. Vegetation descriptions that included historical mean fire return intervals were an important part of the analysis.</p>
<p><i>Wisconsin: Wild Rivers Legacy Forest Site</i></p>		<p>The Nature Conservancy in Wisconsin collaborated with the University of Wisconsin–Madison to develop an expert- and data-based modeling project whose objective was to test the potential effectiveness of conservation strategies, both with and without projected climate change scenarios. The collaborators used LANDFIRE Vegetation Dynamics Development Tool models and spatial data as the foundation for scenario modeling efforts.</p>

<p><i>Wyoming: Bridger-Teton National Forest Vegetation Condition Assessment</i></p>		<p>The Bridger-Teton National Forest Vegetation Condition Assessment documents the process and results of a vegetation condition assessment for six Biophysical Settings (BpS) on the Bridger-Teton National Forest. As a stand-alone product, it provides a comparison of reference to current conditions for the dominant BpS on the forest. The assessment calculated several FRCC departure metrics (stratum vegetation departure, stratum vegetation condition class, and S-class relative amount) using LANDFIRE 2001 BpS and S-class grids, LANDFIRE vegetation dynamics models, and two watershed-based summary units. The report provides a detailed comparison of the historical and current distribution of S-classes for each of the major BpS, and results indicated that most of the major BpS on the forest were moderately departed from reference conditions.</p>
<p><i>Wyoming: Evaluating a Variety of Environmental Factors on the Habitat of the Ferruginous Hawk</i></p>		<p>The ferruginous hawk is considered a threatened species in the western US. Its habitat includes grasslands and sagebrush steppe areas which has been lost to agriculture and more recently, oil and gas development. Oil and gas development in this study area has more than doubled since 2000. Wallace et al. examined all ecological factors relating to the habitat for the ferruginous hawk and determines where research needs to be done. LANDFIRE EVT data were used.</p>
<p><i>Wyoming: Wildland Fire in the Urban Interface</i></p>		<p>Ignition and unsuppressed growth of wildfires starting in a remote portion of the study area were modeled using FSim to support wildland fire management decisions about suppression. The annual area that could burn and the likelihood that wildfires could reach a nearby wildland-urban interface defense zone were estimated. LANDFIRE 2001 spatial layers were a primary data source for the study. Report is available in Fire Ecology (2012).</p>