THE BURNING QUESTION

Why is fire season becoming worse?

By: Christopher A. Dicus, PhD

While fire is a natural ecosystem process in most of California and commonly acts as a dynamic agent of positive change, the increasing size and severity of wildfires in recent years is alarming. For example, in 2012, over 9.3 million acres burned in the United States. And in the last six years, California, Texas, Arizona, New Mexico and Colorado have each experienced the largest and/or the most destructive fires in their history. And in 2013, (CAL FIRE) officials have proclaimed that California could face the worst fire conditions in the last 100 years.

So why have fire conditions become so volatile? Not the least of concern is the lack of precipitation last winter, which was caused in part by high-pressure systems blocking storm tracks into the state. Already, 2013 has been the driest year in California in 50 years. Indeed, the Tahoe region experienced its driest January - March on record this year. The lack of precipitation has led to critically dry fuel moisture levels throughout California, many areas of which are 1 to 2 months ahead of its normal drying schedule, subsequently creating longer periods of time that could produce a high-intensity, stand-replacement event.

Many climate scientists believe that this year's weather pattern could be a sign of long-term climate change that will increase the occurrence of large, destructive fires in California for the foreseeable future. While an admitted lull in projected heating has been observed, more frequent, larger, and higher-severity fires have been predicted in California due to increasing length of fire season, drier fuels, and decreasing forest health. Under various emission scenarios, climate change has been predicted to result in substantial increases in both fire occurrence and area burned, which is especially acute in mid-elevation forests of the Sierra Nevada, northern California coast, and southern Cascade Ranges.

Many climate scientists predict an increase in the number of days in which large, high-intensity fires could be expected. Indeed, mean temperatures and temperature extremes are increasing throughout California and have been predicted to increase between ~3oF and ~10oF by the end of the century, which will facilitate critically low fuel moisture and vegetation types that are prone to burn with greater regularity. Predictions in precipitation patterns vary; while less change is predicted in mean annual precipitation in many parts of California, there

is expected to be greater fluctuations between years and between decades. Also, many areas are predicted to have less snow and more rain, which translates into longer periods without moisture, strongly influences fuel moisture and subsequent fire potential and behavior. Finally, climatic shifts could influence ignitions via lightening and also winds that facilitate large, high-intensity fires.

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In addition to weather, changes to California's forests over the last 100 years have also substantially changed the potential for large, stand-replacement fires. In mid-elevation coniferous forests, which are prevalent in many parts of California, low-intensity surface fires historically occurred every 5 to 20 years, which reduced surface fuel loads and the "ladder fuels" that can carry a relatively benign surface fire into the forest canopy. However, due to policy changes that included aggressive suppression of all fires and prohibition of American Indian ignitions, low-intensity fires have been excluded from many of California's forests for decades and longer. This lack of fire has led to overstocked forests throughout California that are prone to burn in large-scale, high-severity events.

Additionally, these overstocked forests facilitate the potential for extensive insect epidemics due to the weakening of individual trees. For precedent, Californians need look no further than 2003 when millions of acres of forests were threatened by bark beetles, particularly in the San Bernardino Mountains of southern California. Similar to what Colorado is experiencing this year, these dead and dying, insect-ridden forests then readily fuel large, destructive wildfires.

While the climate factors that contribute to severe wildfire season are hard or impossible for California to change on its own, we can better manage our forestlands to make them more resilient to wildfires. There are many tools available for forest managers to reduce the loading and continuity of forest fuels, the preferred manner of which varies from site to site. For example, the use of prescribed fire is the most efficient way to restore forests to historic levels, but there certainly are potential drawbacks including smoke, probability of crown fire in overstocked forests, and the potential for escape, all of which preclude its use in many areas. Mechanical thinning and harvests can act as precursor to or a surrogate for fire, but have been excluded from many private and public forests due to high degree of regulations, prohibitive costs, potential for litigation, and others. These and other factors have led to a significant reduction in milling capacity in California in the last 20 years, which could limit active fuel management via mechanical means.

So will California experience a devastating fire season in 2013? Due to weather and forest conditions, we are certainly ripe for a historic year if ignitions result. To reduce the risk for large, devastating wildfires into the future, Californians must adapt to a potentially changing climate and become more flexible in how to best manage a forest structure that has significantly been altered from historical levels. Only if Californians have the political will to actively manage our forests via a variety of techniques and methodologies will we ever see a reduced threat to our forests and our natural resources.

Christopher A. Dicus, PhD
Professor of Wildland Fire and Fuels Management in the Natural Resources Management & Environmental Sciences Department at California Polytechnic State University in San Luis Obispo. Dr. Dicus sits on the Board of Directors of the Association for Fire Ecology, an international scientific society, and is Coordinator of the Wildland-Urban Interface Module of the California Fire Science Consortium. His research focuses on how management activities impact fuels and subsequent fire behavior, the wildland-urban interface, and various aspects of fire ecology.