The extent and severity of wildfires in the United States during the last decade has been remarkable. Since 2002, there have been six years (2002, 2004, 2005, 2006, 2007, 2011) when over 2.8 million ha have burned, about twice the yearly average of the previous decade. Area burned to date for 2012 exceeds that of all of these years and exceeds the total area burned for the complete fire season for most years since 1960. The 2012 fire season could be a record breaker.

Several factors are contributing to the extent of this year’s fires, including persistent drought, high temperatures, introduced species, and a century of fire exclusion. Drought has been particularly severe and persistent in the Southwest, Southeast, Great Basin, and Great Plains. Fire spreads more easily through dry fuels (dead and live plant parts). Record-size or very large fires have burned in Arizona, Colorado, Georgia, Oklahoma, Texas, Nevada, Oregon, and Utah during the past few years due to drought and high fire season temperatures. The temperature-to-area-burned linkage is part of a multi-decadal trend that shows a strong positive relationship between warming and area burned, at least in the western U.S. The positive temperature-to-area-burned relationship is also evident in centennial and millennial records of paleo-fire from tree rings and sedimentary charcoal. With expected continued warming, fire seasons like those we have experienced this decade may become the new norm. Human agency, however, has also contributed significantly to conditions leading to widespread and severe fire.

The largest fires this year, so far, have been burning in the arid Great Basin. Large burns are now typical of this region where exotic cheat grass (*Bromus tectorum*) occurs. Cheat grass was introduced in eastern Washington in contaminated seed from Europe in the 1890s and spread quickly with agriculture and open range grazing. It is now abundant in the Great Basin and occurs in most western states. Cheat grass replaced perennial native grasses and forbs in the sagebrush grasslands. Cheat grass, an annual, is a prolific seeder; it dries down early in the summer and is very flammable. It promotes fire and increases with fire. A nasty positive feedback cycle of ever-increasing cheat grass and fire has triggered a vegetation shift from shrub-to annual grass–dominated landscapes over large parts of the Great Basin. This, of course, has had significant cascading effects on species diversity, species of concern, and nutrient cycling.

Fire exclusion for nearly a century has also contributed to burn extent and severity, particularly in dry pine and mixed conifer forests that historically burned every 5–30 years. Surface accumulations of leaves, twigs, and small branches, and high numbers of seedlings and saplings due to lack of fire have dramatically altered forest conditions. Surface fuel is now more abundant in these altered forests, and fires can spread readily and be severe. Moreover, flames can more easily transition from the surface into the forest crown by climbing the ladder of fuel provided by the dense
layer of seedlings and saplings. This combination of high surface and high canopy fuel loads can more readily lead to severe fires that can kill or top-kill most or all trees in a stand or in a landscape, depending on weather conditions during the fire. High temperatures and high winds this year have been conducive to severe fire. These severe fires can also trigger vegetation shifts. In the climate-sensitive Southwest, severely burned woodlands and dry pine forests are being replaced by oak forest, shrub lands, or grasslands. Similar vegetation shifts are evident in severely burned dry pine forests on the dry east side of the Sierra Nevada.

Wildland fires threaten people and communities. Vegetation management that decreases surface fuels, canopy base height, and canopy density can modify landscape-scale fire behavior and reduce the risk of intense fire. Implementing well-designed landscape treatment strategies will be most effective in reducing the threat of severe fire effects as fires burn across landscapes, whereas treatments implemented adjacent to communities are likely to be most effective at reducing the risk of loss of lives and damage to property. Given the mixture of public and private land ownership and the different values at risk, engagement of stakeholders will be essential for implementing effective treatments and managing risk. Treatments will also be much more effective at reducing risk of loss of lives and damage to property if they are combined with owner responsibility to fireproof homes and maintain defensible space. Managing fire effects will become even more important as projected warming increases fire activity in many areas in the coming decades.