



Climate Change and Wildfires

What it means to tribes and how we can adapt

What are wildfires?

Wildfires are any uncontrolled fires occurring within natural landscapes such as forests and brush. They differ from other fires due to their size and their ability to spread rapidly from their ignition point. These unpredictable fires have the ability to jump gaps such as roads, rivers, and fire lines, making containment and suppression exceedingly difficult.

Why does it matter?

Over the last 100 years, average global temperatures have increased by approximately 1.2° C (2.2° F) due to increased atmospheric concentrations of heat-trapping greenhouse gases, including carbon dioxide (CO₂). Warmer temperatures are having drastic effects on forest ecosystems, especially in the Southwest.

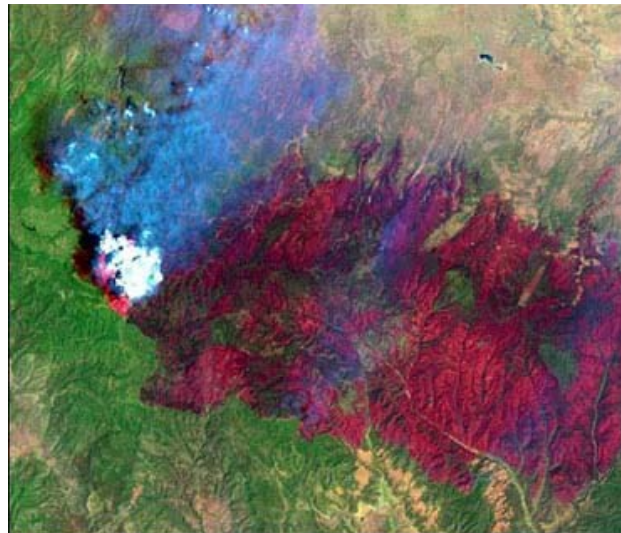
As temperatures rise due to climate change, the occurrence of unseasonably warm temperatures is becoming more frequent. The effects of earlier spring onset and increased summer temperatures are now evident. When spring arrives early, warm temperatures cause the snowpack to melt and subsequently infiltrate into the soil earlier in the year than it would ordinarily. As the Seasons progress, trees have less summer water source making them more prone to drought and ultimately, more vulnerable to forest fires. Forests throughout the Southwest have experienced the effects of earlier snowmelt. Consequently, there has been widespread drought-related die back of piñon pine trees.

Trees that are deprived of water become drier, and once ignited, burn at higher temperatures. High temperatures combined with large quantities of fuel, or biomass, can lead to catastrophic fires like the 2002 Rodeo-Chediski fire in Arizona and the 2011 Wallow fire in Arizona and New Mexico.

Indeed, the U.S. Global Climate Change Research Program states that “record wildfires are... being driven by rising temperatures and related reductions in spring

So called, “hot” forest fires, are very destructive within the forest ecosystem and can permanently alter the landscape, change soil composition, and increase flood susceptibility.

Another concern with warming temperatures and wildfire is the potential for invasive insect colonization and native insect outbreaks. Although insects are a part of the natural forest landscape, they are also highly adept at capitalizing on degraded forest environments. Indeed, the US Forest Service states unequivocally that “the recent large-scale dieback of piñon and ponderosa pine and associated bark beetle outbreaks in the Southwestern United States has been linked to the ‘climate change type drought’.”



Satellite image of the 2002 Rodeo-Chediski fire

Photo: NASA Earth Observatory Website

What can we expect in the 21st Century?

Scientists use global and regional climate models to forecast future climate scenarios. According to model projections, the Southwest can expect hotter and drier conditions, which will further enhance wildfire frequency and intensity.

Anticipated effects of climate change on wildfires:

- Longer growing seasons and earlier snowmelt - this will result in additional combustible biomass material, and drier soils.
- Intensified summer drought conditions.
- Increased migration of pests and pathogens to areas once protected by colder habitats (i.e. Bark beetle)
- Shift in regional vegetation patterns from forest to grassland altering the occurrence and distribution of wildfires. Importantly, grasses, which have higher combustibility, will increase wildfire spread rates.
- Further increase of destructive wildfires and permanently altered ecosystems

What can tribes do?

Wildfires are naturally occurring events that are necessary for forest ecosystem health. Fire management over the past century has emphasized fire suppression. This was a prominent, yet poor management technique as it led to the accumulation of fire fuels and disrupted the natural forest ecology. When wildfires occurred under these conditions, the results were typically catastrophic. More recently, forest management techniques have begun to incorporate active thinning and a managed natural burn

Ways to adapt to increased wildfire risk

- Create evacuation routes in case of a major fire
- Build infrastructure and homes away from large forested areas prone to wildfires
- Create a defensible barrier between home/ infrastructure in case of wildfire

Ways to reduce wildfire occurrence

- Be cautious when disposing of cigarettes
- Do not leave campfires unattended
- Completely drown out all camp fires upon departure
- Only build campfires in designated areas and during permitted times
- Adhere to machinery use restrictions
- Use spark arrestors on all off-road vehicles



Wallow fire, 2011 (Photo: U.S. Forest Service)

Web-Based Resources

- Climate Change in the Pacific Southwest <<http://www.fs.fed.us/r5/climate/>>
- Wildfires and Global Climate Change (PDF), The Importance of Climate Change for Future Wildfire Scenarios in the Southwest <<http://www.pewclimate.org/docUploads/Regional-Impacts-West.pdf>>
- Adaptation to Climate Change in Forest Management <http://www.forrex.org/jem/ISS21/vol4_no1_art1.pdf>
- Wildfires: A Symptom of Climate Change <<http://www.nasa.gov/topics/earth/features/wildfires.html>>
- NASA Earth Observatory Website <<http://www.nasa.gov/centers/goddard/news/topstory/2003/0703esufire.html>>
- US Forest Service Climate Change Resource Center, <<http://www.fs.fed.us/ccrc/topics/bark-beetles.shtml>>
- How Fuel Treatments Saved Homes in the 2011 Wallow Fire, U.S. Forest Service: <http://www.fs.fed.us/fire/management/fuel_treatments.pdf>
- Firewise Communities: <<http://www.firewise.org/Communities.aspx>>

To learn more about funding opportunities, please visit the following sites:

Tribal Climate Change Funding Guide: <http://tribalclimate.uoregon.edu/publications/>

Tribes & Climate Change Funding page: <http://www4.nau.edu/tribalclimatechange/resources/funding.asp>

For more information, contact:

Nikki Cooley, Climate Change Program Co-Manager, Institute for Tribal Environmental Professionals, Nikki.Cooley@nau.edu

Karen Cozzetto, Climate Change Program Co-Manager, Institute for Tribal Environmental Professionals, Karen.Cozzetto@nau.edu

This fact sheet was developed with support from the USDA Forest Service Rocky Mountain Research Station.