



Climate Change and Wildfire

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. 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 increasing atmospheric concentrations of heat-trapping greenhouse gases, including carbon dioxide (CO₂). Warmer temperatures are having drastic effects on forest ecosystems throughout the Southwest^[1].

As global temperatures rise due to climate change, the occurrence of unseasonably warm temperatures is becoming more frequent^[2]. 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^[3].

As the seasons progress, forests have less summer water source making them more prone to drought and ultimately, more vulnerable to wildfires. According to a report produced by the Southwestern Region Climate Change and Forest Planning Work Group, “higher temperatures and a drier landscape increase wildfire hazard and put extra stress on ecosystems^[4].” In addition to increased wildfire risk, the authors of “Wildland Fire and Climate Change” explain that, “at broad scales we can expect more large severe fires (increasing area burned at high severity)^[5]” into the future.

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

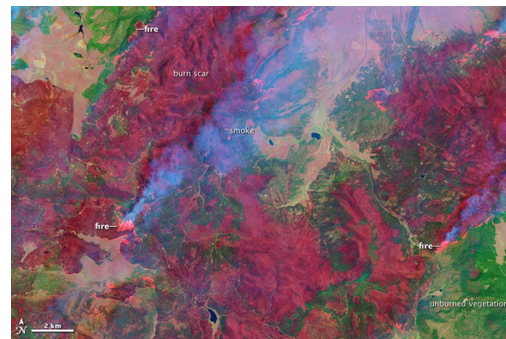
in Arizona and New Mexico. These so called, “hot” forest fires, are very destructive within the forest ecosystem and can permanently alter the landscape, impact the physical and chemical properties of soil, and increase flood susceptibility.

Yet another concern with warming temperatures and wildfire is the potential for invasive insect colonization and native insect outbreaks^[4]. Although insects are a part of the natural forest landscape, they are also highly adept at capitalizing on degraded forest environments. Indeed, the U.S. 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’^[6].”



Satellite image of the 2002 Rodeo-Chediski fire (above) and the 2011 Wallow fire (below).

Photo: NASA Earth Observatory



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 may 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 and drier soils.
- ◇ Intensified summer drought conditions.
- ◇ Increased migration of pests and pathogens to areas once protected by cooler temperatures.
- ◇ 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. However, 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 occur under these conditions, the results can be catastrophic. More recently, forest management techniques have begun to incorporate active thinning and a managed natural burn policy in wilderness and other remote areas.

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 homes and infrastructure in case of wildfire

Ways to reduce wildfire occurrence

- ⇒ Be cautious when disposing of cigarettes
- ⇒ Do not leave campfires unattended and 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

References

1. U.S. Environmental Protection Agency—Climate Change, Southwest Impacts and Adaptation <http://epa.gov/climatechange/impacts-adaptation/southwest.html#impactsecosystems>
2. IPCC, AR4 Working Group 1—Direct Observations of Recent Climate Change http://www.ipcc.ch/publications_and_data/ar4/wg1/en/spmssp-direct-observations.html
3. U.S. Global Climate Research Program—Global Climate Change Impacts in the United States, Regional Climate Impacts: Southwest <http://www.globalchange.gov/images/cir/pdf/southwest.pdf>
4. U.S. Department of Agriculture—Southwestern Region Climate Change Trends and Forest Planning http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5181242.pdf
5. U.S. Forest Service—Climate Change Resource Center, Wildfire and Climate Change <http://www.fs.fed.us/ccrc/topics/wildfire/>
6. U.S. Forest Service—Climate Change Resource Center, Western U.S. Bark Beetles and Climate Change <http://www.fs.fed.us/ccrc/topics/insect-disturbance/bark-beetles.shtml>
7. Firewise Communities <http://www.firewise.org/Communities.aspx>

To learn 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>

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

