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**NEW WEST FEATURE**

## Rocky Mountain Wildfires Set to Intensify?

**What climate models predict for regional fire activity over the next century.**

By Brendon Bosworth, 6-12-11

A NASA global wildfire model does not cast happy projections for the forests of the West in future. As global temperatures increase and the West becomes drier, fire activity in the region could increase by 30 percent to 60 percent from present day levels by the turn of the century, according to NASA scientist Olga Pechony, who designed the model with colleague Drew Shindell.



A wildfire in southern Montana in August of 2007. Flickr photo by NASA Goddard Photo and Video.

At the same time, Pechony and Shindell expect that the wetter, eastern half of the country will experience a drop in wildfires as warmer temperatures lead to more humid conditions there.

Increased wildfire activity would continue a trend that has been playing out over the past 30 years due to warmer and drier conditions in the West making fuel for wildfires more flammable, Peter Hildebrand, director of the earth sciences directorate at NASA's Goddard Space Flight Center, said at the Conference on World Affairs at the University of Colorado in April.

As the earth heats up circulation systems are changing and the winter storm track is being pushed further north. This results in less precipitation, higher temperatures and more evaporation in the Rocky Mountain West, Hildebrand explained.

"I want you to think a little bit of fire as a metaphor for the many things that climate change holds for us," Hildebrand told the crowd in Boulder.

In terms of adapting to increased fire activity, it's important for people living in fire-prone areas to think about home construction, the vegetation around their homes, and the location of homes, he said.

### Projecting Into the Future

The NASA model simulates worldwide wildfire and climate conditions dating back to the year 850. The model projects fire activity across the world as far ahead as 2100. The projections are based on three of the International Panel on Climate Change's scenarios for predicted future greenhouse gas emissions, population growth, economic development and temperature rise. Under all three scenarios, rapidly rising temperatures and regional drying result in an increase in global fire activity after about 2050, according to Pechony and Shindell's model.

Wildfire activity does not increase all over the planet, however. Along with the Western U.S., the model predicts elevated fire activity in southern Europe, India, central Asia, Siberia, southern Africa and Australia. On the other hand, the model predicts that Northern Europe, equatorial Africa and parts of South America will experience a drop in fire activity, along with the Eastern U.S.

To test the model's accuracy Shindell and Pechony compared the model's results to records from charcoal layers harvested from lake sediments around the world, which researchers have used to reconstruct historical fire activity dating back 2,000 years.

"The model really corresponds pretty well to what we see in the charcoal record, so that was quite a relief and a success," said Pechony in a telephone interview.

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At the same time, Pechony and Shindell used current satellite data to check the model's results against present day fire activity. By using available precipitation, temperature, relative humidity and vegetation density data, they could estimate the flammability and availability of wildfire fuels, Pechony explained.

When looking at sources of fire ignitions, satellites provide lightning data from the 1990s onward. However, humans' role in starting and extinguishing wildfires is the "most unknown" variable, Pechony said. To estimate the effects of humans on wildfire activity, Pechony and Shindell used land-use and population density reconstructions from the [History Database of the Global Environment](#).

Using this data, they calculated global fire activity between 2005 and 2008 and checked the results against global fire data from two satellites over the same period. The model results and satellite data corresponded well, Pechony explained.

They also checked seasonal changes in global fire distribution and found the model's results to be very close to the satellites' records, she said. Using another satellite that gives 20 years' worth of global average fire activity, Pechony and Shindell found that the model also reproduced [interannual](#) variations in fire activity, Pechony said.

Pechony and Shindell identify different drivers of global fire activity over time. From 850 up to the time of the Industrial Revolution, precipitation levels largely dictated fire levels around the world. But from the industrial age onward, rapid population growth led to humans becoming the main drivers of fire activity, according to [their report](#). During this time people cleared tracts of forested land to make space for farmland and cattle pastures, which cut back on the amount of fuel that could burn. Around 1900, Pechony and Shindell identify a sharp drop in wildfire even though global temperatures were increasing and precipitation was on the decline, which they put down to humans successfully suppressing more fires.

And while humans have been in the driving seat when it comes to global fire activity since the Industrial period, by 2050 Pechony and Shindell predict that rapidly warming temperatures will play the major role in dictating fire activity around the world.

At some point temperatures rise so rapidly and the environment becomes so flammable that fire suppression efforts are no longer sufficient to curb trends in fire activity that should have been increasing but have been dampened by human activity, Pechony explained.

However, Pechony does not discount the possibility that future fire management and developments in firefighting techniques could improve, allowing humans to override the impacts of temperature rise. "This is something we can't know or predict or rely on," she said.

#### **Northern Rockies Show Greatest Increase in Wildfire Activity in Recent Decades**

While large wildfire activity in the West has increased since the mid-1980s when compared to the 1970s and first half of the 1980s, the greatest spike in wildfire activity in recent decades has taken place in mid-elevation forests in the Northern Rockies, according to a [study](#) by Anthony Westerling and his colleagues. Westerling is an associate professor at the [University of California's Sierra Nevada Research Institute](#).

Using federal fire records, Westerling and his co-authors found that large wildfires (those larger than 400 hectares) burned more than six and a half times more forest in the West between 1987 and 2003 than from 1970 to 1986. At the same time, large fires blazed about four times more frequently between 1987 and 2003 than they did in the previous 17 years. Fires in the forests of the Northern Rockies, a stretch of the Rockies running from the Canadian border to the Utah-Idaho border and lying within parts of Idaho, Montana, Wyoming, Oregon and Washington, accounted for 60 percent of the increase in large fires, according to the study. During this time average spring and summer temperatures increased by less than 2 degrees Fahrenheit. *(Correction: The previous sentence originally gave the wrong figure for spring and summer temperature increases.)*

At the same time, the average length of the wildfire season increased by 78 days between 1970 to 1986 and 1987 to 2003, according to the study.

Since the West is fairly arid, the densest forests are found in the coolest, wettest places, which are in higher elevation areas that get snow, Westerling explained. These dense forests foster high-severity, stand-replacing fires (those that kill off most trees so that new ones replace them), he said.

In the mountain areas Westerling studies topography - the lay of the land - and its role in generating precipitation when air masses move over mountain ridges, plays an important role in determining the location of forests and fire regimes, he explained. Since the NASA model covers the whole world at a coarse scale, it's probably unable to capture these topographic effects on climate and fire regimes, he said.

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"When I look at the Western U.S. - I'm looking, you know, in the last, say, 40 years - there's been a very dramatic response to temperature already," Westerling said.

Most of the increase in wildfire activity has happened in higher elevation forest areas where a short summer dry season is extended when snow melts earlier in spring, which increases the flammability of fuels, he explained.

The biggest increase in fire area burned has been in parts of the Western U.S. where fire management has not had the same effect as it has elsewhere, Westerling said.

Commenting on the NASA model, Westerling said: "I think the broad outline of what they're saying is true, in the sense that as you warm things up temperature is going to overwhelm other effects like management and precipitation."

"The only quibble I would have - I would say temperature is already a dominant driver for the fire regime in a large part of the Western United States," he said.

Westerling's paper, published in Science, was not intended to show that the increase in fire activity in the West was evidence of climate change, he said.

"We already know from other peer-reviewed research, including things covered in the International Panel on Climate Change's reports, that we expect temperature to increase because of human-caused changes in the atmospheric constituents. And we have observed changes in temperature that have been conclusively attributed to human alteration of the climate system in the peer-reviewed literature and we expect that to continue in the future," he said.

Understanding how current fire regimes respond to temperature changes allows researchers to use models that project forward to see how today's fire regimes would respond under future climate conditions, Westerling explained.

In a 2009 paper (PDF), which Westerling co-authored, model projections show that warmer temperatures cause the average area burned each year in the West to spike by 54 percent by the 2050s compared to present day levels. Rocky Mountain forests are hardest hit, with 175 percent more area set to burn, according to the paper.

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By Brendon Bosworth, 6-12-11 | comments (15) | email  
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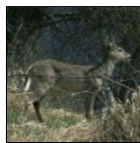
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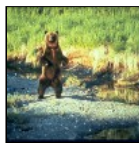
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Comments

**By Dave Skinner, 6-13-11**

So, if it has to burn, is it not better to take off some of the fuels on a tons per acre basis?

Reason A. Fewer stems competing for given water means each stem has more water longer.

Reason B. Fewer stems further apart are less prone to preheat one another or form a solid crown top.

Better living through forestry.

**By Fotoware, 6-14-11**

And, people continue to spew the mantra that wildfires are "natural and beneficial". I'll bet those poor Mexican spotted owls in Arizona are just loving all the smoke and flames, eh? I'll bet all those poor humans downwind are also enjoying the thick smoke, evacuations and lack of tourists, too. It looks like the Rockies are going to suffer tourist losses for a very.... long.... time.

The simple fix is to match forest densities to annual precipitation, cutting trees to produce a species composition that resists drought, insects and wildfires. Sadly, the wildfires represent the "re-wilding" that so enamors preservationists. Yep, until that last lumber mill in Colorado goes under, they will not rest in their quest to eliminate Federal timber projects.

**By Craig, 6-15-11**

The assumption and expectation of continued warming may be seriously flawed: <http://uk.ibtimes.com/articles/163321/20110615/what-happened-to-global-warming-us-scientists-warn-the-earth-might-be-heading-into-a-mini-ice-age.htm>

===quote===

US solar physicists announced yesterday evening that the Sun appears to be headed into a lengthy spell of low activity, which could mean that the Earth, far from facing a global warming problem, is on the opposite headed heading into a mini Ice Age...

Of course, this could have major implications for the Earth's climate and according to a statement issued by the NSO, announcing the research:

"An immediate question is whether this slowdown presages a second Maunder Minimum, a 70-year period with virtually no sunspots [which occurred] during 1645-1715."

NASA, on the other hand notes that

"Early records of sunspots indicate that the Sun went through a period of inactivity in the late 17th century. Very few sunspots were seen on the Sun from about 1645 to 1715. Although the observations were not as extensive as in later years, the Sun was in fact well observed during this time and this lack of sunspots is well documented. This period of solar inactivity also corresponds to a climatic period called the "Little Ice Age" when rivers that are normally ice-free froze and snow fields remained year-round at lower altitudes. There is evidence that the Sun has had similar periods of inactivity in the more distant past."

===end quote===

**By Mehmnet, 6-17-11**

NASA? Oh yeah - that's the agency with the astronauts who go ga-ga over one another, then wear Depends when trying to rub out a romantic rival.

**By jb, 6-17-11**

I wish the global warming people would of been here in montana this winter, cold and wet all yr. it was 38 degrees and raining this morning.. come on global warming we can't wait till it happens but it ain't happened yet

**By Warren, 6-17-11**

NASA is bullshit. How can people continue to take any government agency seriously?

**By the real mike, 6-17-11**

Hark! A host of rednecks doth speak. There must be having a tea party rally over at the trailer park and somebody must have put all the beer next to the computer.

**By Craig Moore, 6-18-11**

May be hard getting some of the "fuel" under the snow to burn: [http://www.flatheadbeacon.com/articles/article/plowing\\_to\\_the\\_sun/23527/](http://www.flatheadbeacon.com/articles/article/plowing_to_the_sun/23527/)

===quote===

"This spring has brought us above average snowpack to way above average snowpack," Blickhan said.

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The struggle to open the road reflects a massive snowpack that has gripped the mountains of Montana this spring thanks to La Niña-type weather patterns that brought increased precipitation to the northwest this winter.

Ray Nickless, a hydrologist for the National Weather Service in Missoula, said that 2011 has been a record-breaking year for snow amounts in Montana. One of the snowpack measuring sites in the park is at Flattop Mountain and during a normal year the water content is at 25 inches. This year it's nearly double that at 49.4 inches worth of water, which equates to almost 10 feet of snow.

"Some of that snow could sit up there all summer," he said, adding that in some places it could even stay until winter.

===end quote===

**By Herb Fischer, 6-18-11**

Hey, Real Mike!

Thanks so much, Man! All these years I have been depending on things like Science and Statistics to form my opinions.

Now I see the error of my ways. I didn't need all that study.... all I needed was a Mikey to tell me how smart he is and how dumb I am. After reading his opinions- wait- he didn't give opinions- he only told me that mine were wrong- I understand that anyone who has studied and generally accepts the science of Forestry is (a) a Redneck (b) Lives in a Trailer Park and (c) drinks a lot of beer. I don't live in a Trailer Park, but the other accusationals are probable

**By Herb Fischer, 6-19-11**

How much does the "let it burn" policy have to do with increases in burn acreage?

When Colorado had the half million acre fire a couple of years back the fire was unmanned for three days.

I am no longer involved in Fire Control. I was a Missoula based Smokejumper for four seasons many years ago and a Hotshot in California before that. (Someone told me that the Air Force had a school where they would teach you how to land the airplane.... led to a 50 year 30,000 hour gig in aviation).

Way back then we jumped fires that weren't going anywhere, fires that obviously needed to be jumped, and a majority that fell somewhere in between- but we were on all of them within a couple of hours and had most of them contained fairly quickly.

Two facts are obvious. We put out some fires that should have burned and put out a lot of fires that could have caused substantial damage. Differentiating between the two can only be done retroactively.

The Smokejumpers were started to get people to fires before they could spread. There is no longer any reason for us under Let it Burn. Why agonize for a couple of days over whether or not to fight a fire and then decide to jump it in an hour or have pounders on it in a day?

Fire is an important tool in Forest Management, but one that is best employed on our terms. There is a huge difference between a controlled burn in October and an uncontrolled fire in August.

I get really steamed about the media coverage of how many buildings were burned....

What about timber? What about Watershed? A \$6000 toolshed is more newsworthy than millions in timber.

The most disturbing thing- this discussion depends on the Bumper Sticker PC statements of the Sierra Club, et al, against scientific fact.

**By Fotoware, 6-19-11**

Yep, Herb, you are absolutely correct on every point. The fire suppression people even want to apply "Let it burn" to each and every fire, regardless of the source of ignition. The cry now is "Preserve Wildfires!". Today's wildfires are NOT "natural and beneficial", and we don't need more lodgepole forests. What I call the LPI (Lodgepole-Ponderosa Interface), has grown by leaps and bounds since Europeans

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first came west. Why do we want to "preserve" forests where lodgepoles have invaded, making the old growth ponderosas susceptible to drought, bugs and wildfires? Do we want forests that live for centuries, or do we want forests that die, rot and burn every 100 years?!? It simply isn't "sustainable" to keep vast fuels-choked forests "preserved", waiting for that inevitable lightning strike or human ignition to cause massive, unnatural wildfires. The ESA requires management plans for endangered species but, ignores management of habitat. Many organisms are on the list, due to habitat loss.

**By the real mike, 6-19-11**

Gosh, Herb and footwear, you kind of need to reread the article. You've both missed the point of both the article and the bulk of the comments above. Yet, blessed your pointed little heads, you're both churning with so much ego and hubris that you're about to pee in your pants trying to shove your opinion out there and control the discussion aren't you?

**By Dave Skinner, 6-19-11**

Well, I see the troll is back from his latest rock-finding trip. Gosh, we missed you, Faker. Your gratuitous insults from the safety of the ether are SO vital to the discussion.

Herb makes really good points about fire timing and the loss of timber resources.

Induced fire was a huge factor on the landscape before the white people showed up. And the Indians burnt appropriately for human benefit.

Sometimes, that "benefit" was in August when you could sneak into your enemy's turf and smoke their game fields, maybe even their camps.

Other times, the benefit was spring or fall burns that would kick-start the grass or berries for next year.

As for Westerling, he makes a certain amount of sense about the water cycle in higher temperatures. More time and intensity of evaporation, period. So, if that's the case, what do you do to keep more water available for the existing biomass on a per-unit basis over the annual water cycle? Fewer stems, less biomass.

That's called adaptation of the system. The fires in Arizona right now are more like extinction.

**By Fotoware, 6-19-11**

Why not listen to the foremost expert on wildfires, Dr. Stephen Pyne?

<http://www.azcentral.com/arizonarepublic/viewpoints/articles/2011/06/11/20110611pyne-wallow-fire-monster.html>

The money quote: "We aren't going to stomp fire out, and we can't afford to outsource it to lightning, arsonists, and sloppy campers. We know better. We've known better for years. We just can't muster the social consensus to fix it. It's finally worth noting that only a scratch line in the duff separates tragedy from travesty."

I place my trust in Dr. Pyne, as I can verify the truth of his writings with my own personal experience. I have worked on some of the biggest wildfires in the last 20 years and have seen the damages and impacts of catastrophic wildfires. Please read the article, as it tells it like it is.

**By bearbait, 6-19-11**

Trillions poured into Land Grant Universities. Hundreds of papers saying man determined the vegetative landscape the romantic from Europe found here and they in turn exploited them for the game, the open land for farms, for the old growth timber. And that table was set by more than ten thousand years of Indian burning. They burned because that was their tool to control their destiny in a very flammable environment. They didn't have caterpillar tractors.

All that had to happen was to extirpate the Native American, the fire maintenance experts, and watch the trees grow. And they did, and now they are once again burning, in the second cycle of catastrophic wildfires that Gifford Pinchot, Teddy Roosevelt and other conservationists created the USFS to end. It is weather that is burning. It is fuel. Fuel is plants, and plants grow every year, drought or flood. Some years they grow more than others, but like interest in a savings account, that growth compounds and in a century or more, we have huge fuel levels absent any attempts to reduce them. Fuel is burning now in Arizona and New Mexico. The monsoonal weather will come, and the fires will work their way north with seasonal drying, outdoor

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use, and lightning, although lightning can account, historically, for only a small part of past fires. Man is the fire maker. Good or bad. Man is the determinant on how much fuel, and how many acres burn. Fire is a political result. Fuels are a political result. We have found the enemy and he is us.....

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