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What's Inside...

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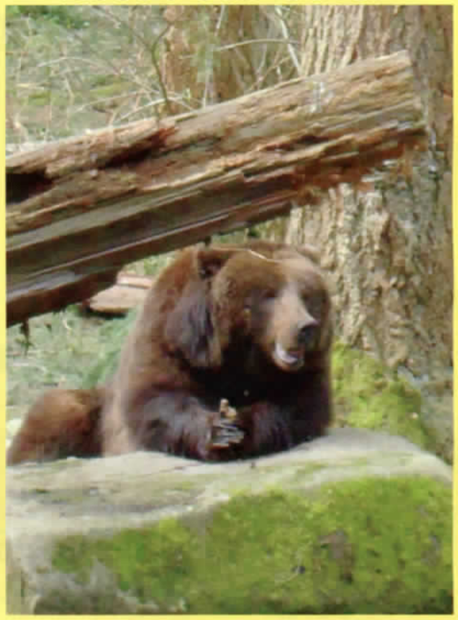
About Our Cover



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Predicting Oregon's 2012 Major Wildfire Events

By Bob Zybach, PhD

Because my PhD is in the study of historic catastrophic wildfires in western Oregon – and because I am part of a network of other scientists, professionals, and resource managers with similar interests – every year about this time I seem to get asked the same basic questions: "Bob, what do you think the chances are of Oregon having a really huge wildfire this year?" And, "When and where can we best expect it/them to take place if and when they do occur?"

The fact is I have no idea what the answer is to those questions. Nobody wants to hear facts, so my given answer always is: "August and September will be the riskiest months west of the Cascade crest (see Fig. 1), with likelihood of uncontrollable wildfire to increase in proportion to length in time of east wind events, and severity in proportion to condition, continuity, and volume of available fuels. Eastside is basically the same for forested areas and shrublands, with the riskiest months beginning in July and ending in October."

Fig. 1. Smoke plume, Rainbow Creek Fire, September 22, 2009. This fire became more than 3,000-acres within 24 hours, and grew to more than 6,000-acres total. The Boze Fire, in the foreground, became more than 10,000-acres total (Photo by J. Baldwin, US Forest Service, obtained online: www.inciweb.org/incident/1893/).

Most of the time my predictions are fairly accurate, depending on how one defines "risky," and whether any prolonged east wind events take place during those months for that year. Other than vague adjectives and qualifiers, however, the main reason for my accuracy is that it is based on a generalized description of almost all of the major wildfire events that have taken place since Americans first began emigrating to the Oregon Country in the early 1840s (see Fig. 2). There is a good documentary record of the "Great Fires" from that time until now, and they are basically late summer-early fall events, defined in large part by east winds.

Realistically, it is difficult to tell when a wildfire is going to take place, and from there it becomes a matter of hours and minutes as to how it is affected by – and how it directly affects – local weather conditions. Wildfires can create gale-force winds, lightning, tornadoes, cumulus clouds, and even rain under the right conditions, and almost all of these occurrences are unpredictable even minutes before they begin taking place.

Fig. 2. Tillamook smoke plume over the Willamette Valley, August 24, 1933. On this single day in 1933, the Tillamook Fire increased more than 200,000-acres in size, creating a mushroom cloud 40 miles wide and 8 miles high and producing hurricane-scale winds that furthered the spread of the fire. (Photo from Portland, Oregon Oregonian, used by permission of the Oregon Department of Forestry).

The "volume of fuels" is another matter; we know where they are and what they are – it's just whether or not they will burn in a wildfire, and if so: to what degree and when? Pitchy conifer trees, snags (standing dead trees), and downed wood are among the most volatile wildfire fuels that exist. Oregon contains among the largest contiguous amounts of these types of fuel in the world. The potential severity of this condition is increased as these fuels have increased in both volume and in total acreage during the past 30 years. This phenomenon is particularly apparent in the ancient prairies, savannahs, berry fields, and pine woodlands that have become invaded with Douglas-fir, lodgepole, true fir, and juniper during historical time -- and also true for vast acreages of the State that have become covered with millions of snags in recent years; victims of bugs, wildfire, competition, and passive forest management (see Fig. 3).

The likelihood and severity ("plant and animal mortality") of a wildfire, then, is dependent on what starts burning and where; what the weather is like in the immediate vicinity of the fire; and how the fuel is arranged across the landscape. Fires typically – but not always -- move upslope faster and hotter than down slope or across a flat, and move easier through fuels that are continuous, rather than broken by openings or abrupt changes in vegetation types or fuel moisture.

Fig. 3. Pacific Crest Trail, near the Santiam Pass, May 14, 2004. The August-September, 2003 B&B Complex was the largest single wildfire in Oregon Cascades history, totaling more than 95,000-acres in size. As snows began to melt the following spring, it became apparent what damage had been done to popular hiking trails, campgrounds, scenic viewpoints, and other recreational opportunities (Photo by B. Zybach).

The final ingredient is fire. Almost every wildfire is started by either people or lightning, so if we can predict where they will be between July and October, we can better predict where wildfires (and particularly, big wildfires) are most apt to take place. Lightning-caused fire is fairly predictable (see Map 1). It is people – the only animal capable of making and using fire – that are unpredictable. Almost every one of us uses fire in some form or another nearly every day; and most of us make poor or illogical decisions from time to time as well. The vast majority of wildfires are made by people making poor or illogical decisions with fire at unpredictable times in unpredictable locations (see Fig. 4).

That being said, the intent of this article is to provide readers with the best idea as to whether Oregon will experience another catastrophic-scale wildfire (typically, 100,000-acres or more in size), or not, in 2012; and if so, when and where are such events most likely to take place? Of more common concern: when and where are any wildfires likely to occur this year?

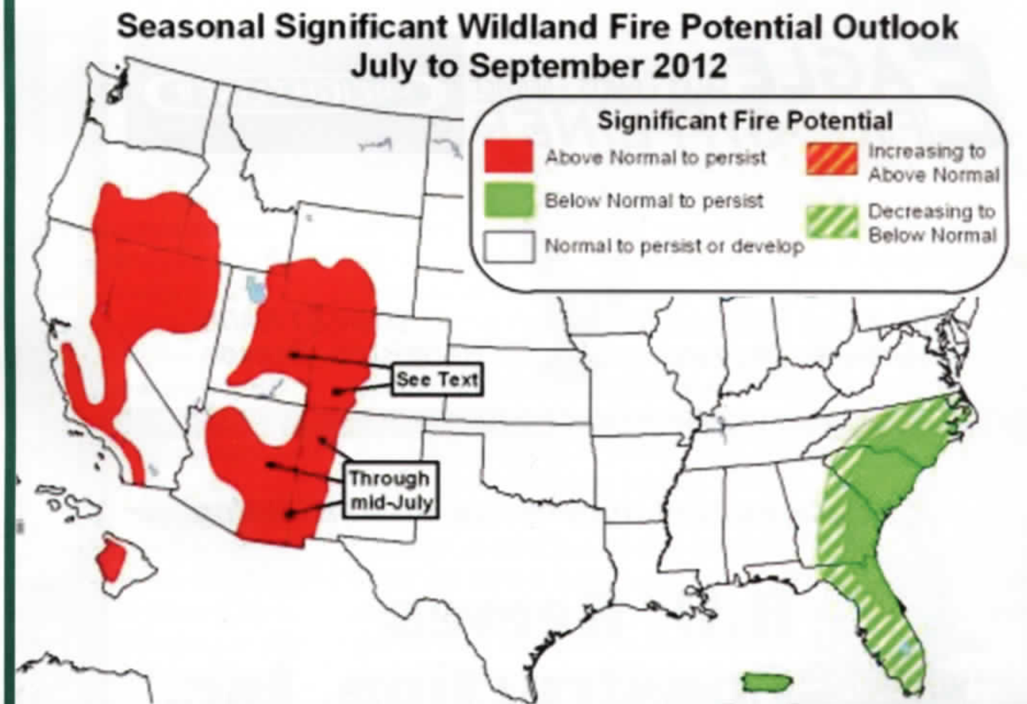
To answer those questions, and in addition to my own generalized prediction, I've assembled three predictive maps to compare with what really does happen this fire season. Three months from now, in the next issue of Oregon Fish & Wildlife Journal, we will revisit these predictions and see which were most accurate – just remember: each is predicting wildfire within different parameters, and each comes with its own qualifying jargon. With proper syntax, it is possible that all four projections will be accurate. Or not.

Fig. 4. Burned home, Deer Creek Fire, August 28, 2005. Although this fire near Selma was a relatively small 1,600- acres, several families lost their homes because of it, and it was the largest wildfire in Oregon that year (Photo by B. Zybach).

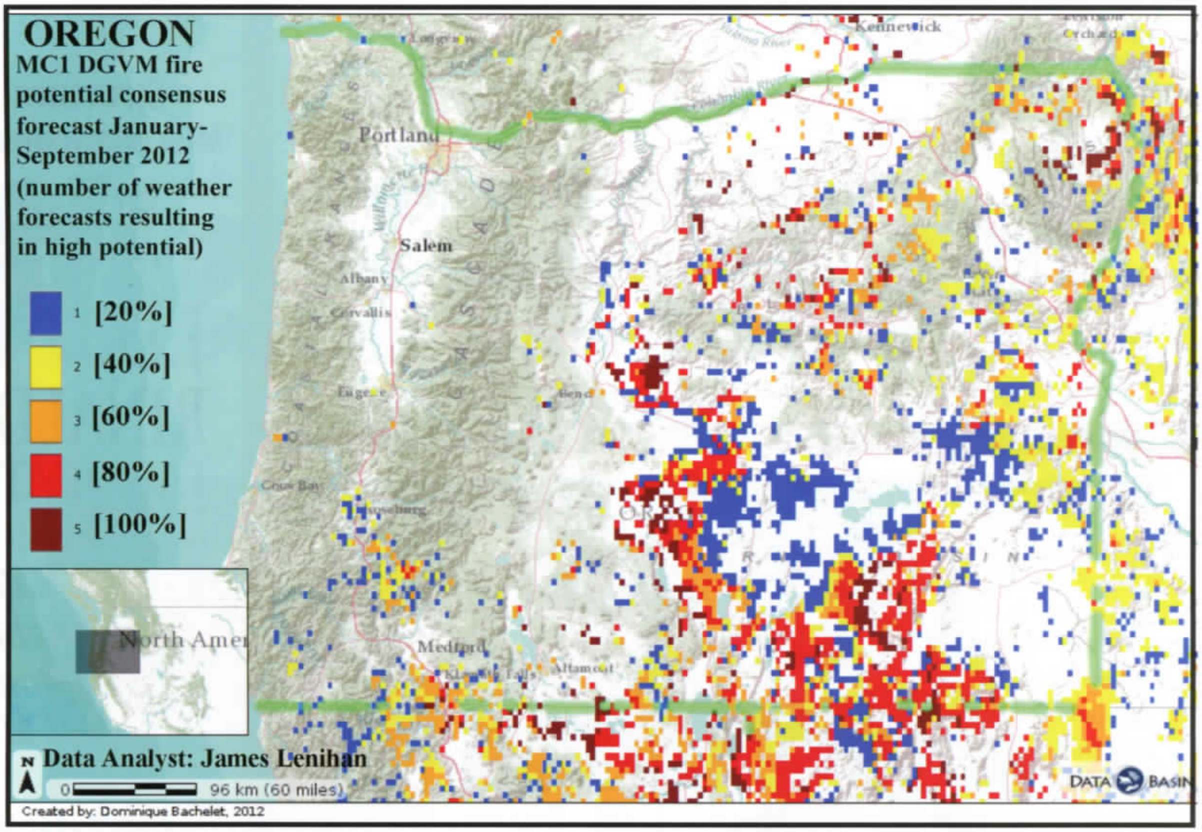
Map 1 was put together in 1934 by an expert on wildfires, William G. Morris, so as to better prepare wildfire managers to deal with future events. At that time – near the beginning of the Dust Bowl 1930s -- there was no concern about climate change; assumptions were that weather patterns would remain about the same through time, while acknowledging floods, droughts, freezes, windstorms, etc., "of biblical proportions" from time to time. Morris' map shows "Occasional" lightning fires along the Oregon Coast, but increasing numbers of such fires along the entire length of the Cascades, northeasterly through the Ochocos and Blues to Hells Canyon, and southeasterly along the northwestern rim of the Great Basin to California.

FIGURE 14. – Zones of average yearly lightning fire distribution on the national forests of Oregon and Washington obtained by plotting the locations of the 5300 lightning fires reported from 1925 to 1931

Map 2 was issued on June 1, 2012 by Predictive Services for the National Interagency Fire Council in Boise, Idaho. This is their job. They have divided the United States into five different classifications for the next three months, with Oregon given two classifications: Normal (white) and Above Normal (red). Of particular interest is that the entire red area is contained in the one part of Oregon that doesn't drain into the Pacific Ocean – the Great Basin. On the surface, a geographical area that is best known for salt lakes and vast deserts with hardly any vegetation would seemingly be an unlikely choice as the part of the State most likely to experience a wildfire; but that portion of the Basin in southeast Oregon also features the Steens Mountains and numerous forested areas, shrublands, and grasslands that have grown rank with invasive native plants and exotic weeds in recent decades. Too, the July to September timeline fits in nicely with my own July to October prediction, although I safely included everything east of the Cascades, not just the Great Basin lands.



Map 3 was constructed June 8-9, 2012 with the direct help and advice of the people who developed and maintain this particular predictive model for the entire US. It represents the most current results from a vegetation/wildfire predictive model first assembled by James Lenihan, US Forest Service, Pacific Northwest Research Station (MAPSS Team, Ron Neilson team leader - now retired), in the late 1990s; with five climate projections provided by the International Research Institute for Climate and Society formatted by Ray Drapek (MAPSS team); to the transformation of his output data to GIS layers (http://bit.ly/JU39Zy) for storage, display, and delivery (this map, as an example) by Dominique Bachelet and Conservation Biology Institute staff; through Data Basin (http://databasin.org/).



So, that's all the fine print, and also useful links for those readers with a technical or professional interest in these topics. The take home message is Map 3 colors represent the "percentage agreement between the five projected fire risk maps driven by five different weather forecasts." That is, Blue shows that "under one" of the five future climates (>20%) the fire forecast model simulates a potential future wildfire problem area; if the pixel is orange, then under three future climates (>60%) fire forecast results are in agreement, and if it is maroon, all five climates (100%) cause the fire forecast model to show that particular area as most likely to experience wildfire this year.

What does Map 3 tell us? First, there is little agreement among the five climate drivers on wildfire danger this summer west of the Cascades – mostly along the I-5 corridor south and east of Roseburg, to the California border, with greatest likelihood along the Klamath and Applegate rivers. On the east side, a vortex of high risks seems to form to the northeast of Bend, near Prineville: with one arm extending northeasterly through the Ochocos and Blue Mountains, to a heavy concentration of maroon pixels in the Wallowa-Whitman National Forest on the west side of Hells Canyon; and with another arm moving southeasterly, along the northwestern boundary of the Great Basin in the Fremont National Forest. Surprisingly little activity predicted for the Deschutes, Mt. Hood, Willamette, and Rogue-Siskiyou National Forests, among others.

Conclusions

In many ways, Map 3 agrees with Map 2 in that both predict the greatest likelihood of wildfires in Oregon this fire season to be in the Great Basin sometime between July and September. Map 3 is more detailed, however, and excludes the Alvord Desert and other portions of southeast Oregon that don't have enough fuel to create a wildfire in the first place. Another surprising consistency between the maps is that neither indicates much risk (other than "normal") for western Oregon and for the eastern slope of the Cascades. Maybe the definition for "normal," though, is becoming modified by such historic events as the Biscuit Fire and B&B Complex.

Wildfires are started by people or lightning. Map 1 shows the history of more than 5,000 reported lightning strike wildfires throughout Oregon from 1927-1932. If the historical record is a reasonable predictor of future events, then this map should also be considered until these patterns can be shown to have changed. Two things of note: there is considerably more risk shown along the length of the Cascades than indicated by either of the other maps; and there is nothing shown for the Great Basin. In the first regard, perhaps Map 1 is simply depicting the "normal" wildfire risk for those areas; and so far as southeastern Oregon is concerned, much of it was still being heavily grazed by sheep and regularly burned by sheepherders when this map was made –and probably nobody bothered to "report" a wildfire in that area at that time anyway. No one cared; now we have satellites.

So there we have it: four different predictions for Oregon's coming fire season, three documented with maps and one generalized with qualifiers (but an exacting timeframe). In the next issue of Oregon Fish & Wildlife Journal we'll see whom, if anyone, best predicted this year's wildfire events.