Chapter 3
Extent

Valley Complex Crown Fire. (photo by Karen Wattenmaker)

The Extent of the 2000 Fire Season

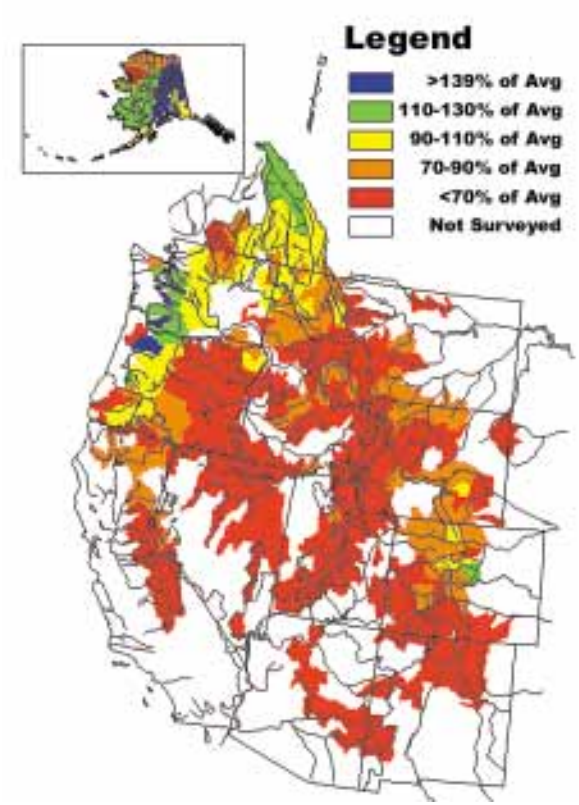
Four primary factors influenced the extent of the Bitterroot fires of 2000. The first was the weather. A dry winter and spring progressed into a warm and exceptionally dry summer. The second was extraordinarily dry vegetation that added to the growth of large fires. The third was firefighters, whose efforts prevented fires from burning millions of additional acres. The fourth was the many large fires burning simultaneously across the West, draining firefighting resources.

Weather

A dry winter and spring progressed into a warm and exceptionally dry summer.

The 2000 fire season got its start in 1998 when a pool of cold water in the Pacific Ocean, referred to as La Nina, began to modify weather patterns of the western United States. As a result of La Nina, lower than normal precipitation in the autumn of 1999 added little moisture to the fuels dried during the summer and early fall of 1999. Winter precipitation also was less than normal over much of the area. Low and mid elevation spring snowpack was less than 70 percent of normal over vast areas of the western United States (Figure 7). In the western half of the Northern Rockies, including the Bitterroot, lower elevations lost their snowpack in early February, causing an early spring vegetation "green-up."

Figure 7: Mountain snow pack as of May 1, 2000.



Sporadic and generally lighter than normal spring rains did little to relieve growing drought conditions. However, spring showers were enough, when combined with the early "green-up," to create an abundance of grass and other light vegetation in some locations. These grasses, forbs, and shrubs cured in the late spring and early summer and added to the fuel available to

burn. Prescribed burns by land management agencies in the spring provided strong indications of the potential intensity of the coming fire season. In many areas of the Northern Rockies, these spring burns completely consumed the larger fuels and burned deep into the organic layer of the soil. Throughout the spring of 2000, drought conditions intensified in the Bitterroot and throughout the Northern Rockies. In the Bitterroot drainage, monthly precipitation was significantly below average every month from February until September (Figure 8).

Figure 8: Bitterroot Percent of Average Precipitation.

The normally active spring storm track across the Pacific Northwest weakened during the month of June. This caused the development of a high pressure system in the Southwest and several pulses of moisture into southwestern Montana. Between these pulses, several weak, low-pressure systems tracked across the Pacific Northwest during the first half of July. These were responsible for numerous lightning storms over the Northern Rockies, including the central Idaho mountains and western Montana. However, none of the low-pressure systems or thunderstorms produced significant moisture. By mid-July, moisture deficits combined with temperatures running near to or above normal resulted in severe to extreme drought conditions over most of the region.

Vegetation Conditions

The persistent trend of below normal precipitation dried out vegetation, with the moisture content dropping to critical levels by late July. "Live fuel moistures," or the amount of moisture in live vegetation, in the Bitterroot were 55-75 percent below average. The effect of this moisture stress on forest vegetation was quite evident: the leaves of arrow leaf balsamroot plants were cured and curled; a double handful of native grasses could be twisted and broken without much effort; and shrubs were turning to fall colors and dropping their leaves. Even larger shrubs like chokecherry and serviceberry started to turn color and drop withered leaves. Pine trees began to shed many of their needles, adding to the layer of dry fuels on the ground. By the end of July, a walk through the woods sounded very crunchy.

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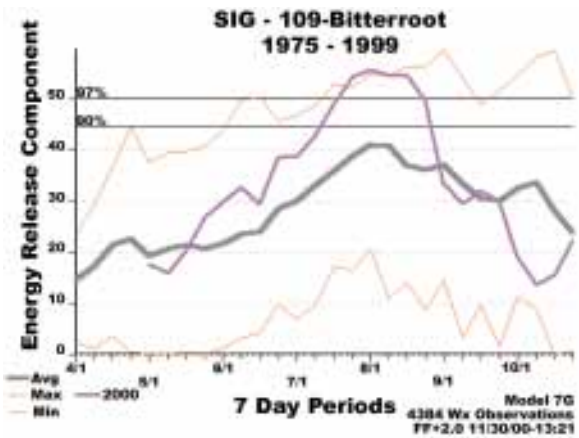
These exceptionally dry moisture levels for live vegetation had the effect of adding significant amounts of flammable vegetation to areas that are often green enough to impede fire spread. The situation was much the same, if not worse, for dead vegetation. The moisture content of large dead fuels fell below average in mid-May, and was at record lows from mid-July until the last week of August. Fire behavior analysts observed these conditions on the normally moister north facing slopes, and at high and low elevations. In sum, the fuel moistures observed in mid and late July indicated extreme burning conditions.

Figure 9: Energy Release Component.



The Energy Release Component (ERC) provides an estimate of fire potential in the absence of wind. Figure 9 displays the potential, using a fuel model with large amounts of dead fuels of all sizes. These conditions are common on the Bitterroot National Forest. In the summer of 2000, the ERC was well above normal for much of the fire season, and exceeded the levels of 1988 and 1994, two recent years with considerable fire activity. Later in the summer, ERC levels would reach or exceed record levels at many weather stations in the region.

As potential burning conditions worsened through July, dry lightning storms were occurring every few days in the Northern Rockies. (National Interagency Fire Center photo)

Firefighting Resources

During the first week of June, a lightning strike in the Fish Lake area, high in Bitterroot's upper East Fork, grew to five acres before being declared out on June 9. Fire managers were alarmed to see this high elevation fire grow so large in early June while some snow was still on the ground. It was an early taste of things to come.

As potential burning conditions worsened through July, dry lightning storms were occurring

every few days in the Northern Rockies. In addition, the number of reported human-caused fires began to increase. Between July 1 and July 30, the Bitterroot National Forest reported 107 fires (Figure 10).

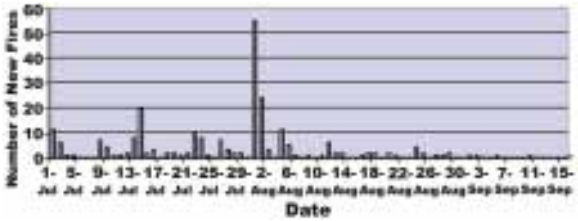


Figure 10: Number of new fires on the Bitterroot.

Initial attack crews suppressed all but three of these fires before they reached 100 acres in size. In the two-day period beginning July 31, the Bitterroot National Forest reported 78 new lightning fires. Within five days, initial attack crews successfully controlled all but 25 of these fires. For the entire 2000 fire season, initial attack crews successfully controlled over 230 fires, or more than 86 percent of all reported fires. Given the extraordinarily dry fuel conditions, the efforts of these women and men were remarkably successful.

Despite these initial attack efforts, dry fuel conditions often led to rapid rates of spread, torching, crowning and short duration fire runs with as little as three-mile per hour winds. Occasionally fires grew so rapidly that even when a fire crew responded within half an hour the fire spread rate and fire intensity prevented containment. All types of fuels, and the upper levels of the duff layer contributed to fire intensity, even on the normally wetter, north slopes. Any area exposed to wind had a high potential to escape initial attack.

Rapid fire spread and high fire intensity presented significant concerns for the safety of firefighters. Firefighter safety is always given the highest priority. Firefighters were forced to back off from initial attack due to unsafe conditions presented by some fires, such as the Twin Fire which started in the Upper Hughes Creek drainage on July 13. This fire grew rapidly and spread onto the neighboring Salmon National Forest.

Multiple Large Fires and Limited Resources

During an average fire season in the Northern Rockies, large fires generally do not occur until early to mid-August. This was not the case with the 2000 fire season. In late June and early July, numerous fires escaped initial attack in Utah and Nevada. By mid-July, the trend of increasing numbers of fires greater than 1,000 acres began to spread north into Idaho and Montana.

A set of dry lightning storms from July 12 through the 15th started hundreds of fires in central Idaho and western Montana. While initial attack crews quickly contained most of these fires, several escaped. Among the large fires that began with these storms were the Eagle Point and Little Blue Fires on the Bitterroot National Forest.

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The Little Blue Fire began in the early evening of July 13 when a lightning strike hit high in the Little Blue Joint Creek drainage in the West Fork. Due to the inaccessible location of the fire start, initial attack resources could only access the fire rapidly by helicopter. The next day, a frontal system moved through the area generating sustained winds of 15 to 20 miles per hour with gusts of 30 to 40 miles per hour. At the same time, temperatures reached 85 to 95 degrees and relative humidity was less than 20 percent. These forces combined with fuels that were exceptionally dry for the time of year and elevation to produce a major fire run. On the afternoon of July 14, the Little Blue Fire turned into a sustained crown fire moving about six miles in six hours, burning downhill through 5,000 acres of mixed conifer forest.

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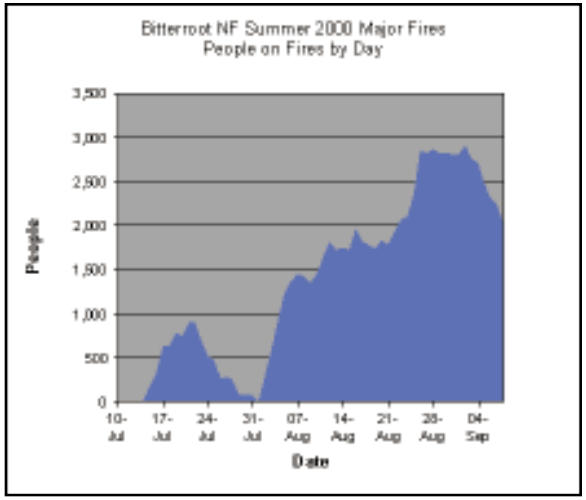
The early lightning storms produced other large fires in central Idaho and western Montana, including the Seeley, Monture, and Spread Ridge Fires on the Lolo National Forest; the Clear Creek and Fenster Fires on the Salmon-Challis National Forest; and the Nick and Burgdorf Junction Fires on the Payette National Forest. Many of these fires would remain uncontrolled into September, and would burn more than 330,000 acres. In the last two weeks of July, the number of simultaneous, large, uncontained wildland fires continued to climb throughout the West. Of the hundreds of fires that started between July 30 and August 14, more than 30 grew to more than 10,000 acres in size.

Hot daytime temperatures and exceptionally low relative humidity at night, combined with unstable atmospheric conditions caused spectacular fire growth. This fire behavior was not driven by regional wind events. Rather, these were “plume” dominated fires driven by large amounts of exceptionally dry fuel. These fires created their own vigorous winds and smoke columns that reached 30,000 feet in altitude. It was common for firebrands to travel more than 1.5 miles. On August 6 and 7, numerous fires grew together, burned thousands of acres in or near populated areas, and destroyed dozens of homes.

The Bitterroot experience during early August was more intense than most fire areas, but it was not unique. At one point during this period, the National Interagency Coordinating Center in Boise, Idaho reported 99 uncontrolled large fires in the United States. The rapid escalation of the number of large fires quickly exhausted the nation’s firefighting resources. On August 1, more than 10,000 professional firefighters from rural fire districts, county fire departments, and state and federal land management agencies throughout the United States were working on fires in the Northern Rockies and Great Basin. Several states mobilized National Guard units to assist in the effort. Moreover, many fires were

Figure 11: People Assigned to Bitterroot Fires.



burning so intensely that initial attack and large fire control strategies were increasingly ineffective.

By the second week of August, every Firefighting Team in the country was committed. There were no teams left to assign to new fires or to relieve exhausted teams. The same was true for "hotshot" crews and essential supervisory positions. The nation had run out of trained people to fight wildland fires.

More people were hired and quickly trained, but the lack of available and experienced supervisors limited the ability of Incident Management Teams to safely utilize newly hired people in fire

By the second week of August, every Firefighting Team in the country was committed. (Bitterroot Hotshot crew photo by Karen Wattenmaker)

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suppression assignments. In mid-August the National Interagency Coordinating Center requested the assistance of the military. By the end of August, more than 3,000 soldiers and Marines had joined the effort in the Northern Rockies and Great Basin. Six hundred soldiers were assigned to the Bitterroot fires. More than 1,300 firefighters arrived from Canada, Australia and New Zealand. But the fires continued to grow larger. By August 25 the number of people working on fires in the Great Basin and Northern Rockies had grown to 18,000.

During the summer of 2000, more than 10,000 people supported firefighting efforts in the Bitterroot Valley.

Nearly 3,000 people were assigned to Bitterroot fires at the height of the suppression effort (Figure 11). During the summer of 2000, more than 10,000 people supported firefighting efforts in the Bitterroot Valley.

As a result of the intense burning conditions, the extraordinary number of large fires, and limited suppression resources, fire managers clarified their priorities. By early August, the following priorities were very clear and well known among those engaged in managing the Bitterroot fires:

1. Protect firefighters and the public.
2. Protect communities.
3. Protect homes and other structures.
4. Protect critical natural resources.

These priorities have been the official policy of federal land management agencies since the adoption of the 1995 Federal Fire Policy. However, in previous years, fire managers normally were not forced to choose among these

Mescalaro Hotshot Crew Member at the Valley Complex. (photo by Karen Wattenmaker)

priorities; they usually could achieve them all. This was not the case during the 2000 fire season.

Given the number of large fires and limited resources, regional fire managers were forced to make difficult choices in allocating scarce resources among numerous large fires, while also maintaining the capability for aggressive initial attack to keep new fires from turning into large fires. Similarly, incident commanders of individual fires and complexes strictly adhered to the priorities when allocating resources on their fires, and in developing daily tactics. The application of these priorities and the limited availability of resources are clearly revealed in the excerpts from the August 20 "Incident Intelligence Summary" (ICS-209) for the Valley Complex (Figure 12).

Figure 12: Excerpts from Incident Intelligence Summary, August 20, Valley Complex.

Actions planned for the next operational period:
Actions will maximize protection of communities and structures. This will result in no staffing for lower priority divisions and fires. Continued direct line construction where structure protection is best accomplished by direct actions on the fire. Community protection implementation, burnout, holding, IA and overhaul, and mop-up around structures as required.

Major Problems and Concerns:
Rural-Wildland Interface and associated structural protection, smoke and fire impacts slowing traffic movement on Hwy 93 from Conner to Lost Trail Pass, smoke impacts on area residents and firefighters, lack of critical resources, erratic fire behavior and rapid fire spread, 200 plus miles of uncontrolled fire perimeter. Smoke and inversions significantly limit air support.

How likely is it that containment/control objectives will be met, given the current resources and suppression strategy:
Current suppression strategy is directed toward fire fighter and public safety, then the protection of property; containment objectives are established and met when they contribute to the first two priorities.

Remarks:
The Razor fire came out of the Chicken Creek drainage with 200-300-foot flame lengths, threatening homes and outbuildings. No additional homes were lost. Affected communities on the perimeter of the Bear and Razor fires will have fire at or through structures during the next 24 hours. Structure protection efforts are on-going on all sides of the complex. At least 700 homes are now evacuated. Estimated acreages are as follows: Bear fire: 130,000; Taylor fire: 13,000; Taylor Spot: 1,800; Mink fire: 800; Hilltop fire: 100; Fat fire 300; and Razor fire 8000.

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Fire managers throughout the West faced similar circumstances during August. The fire management priorities proved essential to ensuring the most effective allocation of limited resources to protect people and communities. Rapid control of these large fires was not possible without a significant change in the weather.

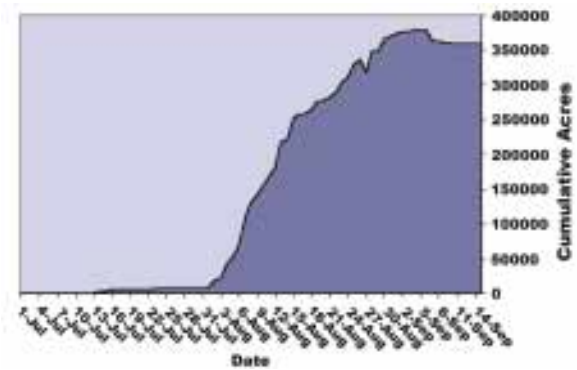
Summary

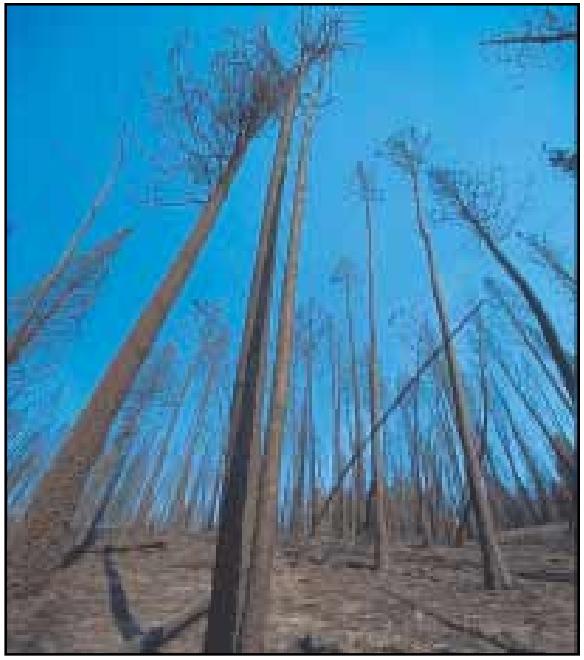
The beginning of September brought scattered showers and even snow to the higher elevations in some areas of the Bitterroot and elsewhere in the Northern Rockies. Fire behavior decreased to smoldering, creeping, isolated torching and occasional runs of short duration.

Rapid control of these large fires was not possible without a significant change in the weather.

The final statistics are sobering. Throughout the Northern Rockies and Great Basin, more than three million acres burned, which is about 50 percent of all the acres burned by wildland fires this year in the United States.

Figure 15: Acres burned on the Bitterroot National Forest.





Stand-replacing fire in the Sula area. (photo by Karen Wattenmaker)

On National Forest lands, fires burned in Wilderness areas, roadless areas, areas managed for recreation, and areas managed for timber or forage production (Figures 13,14,15). At this point in time, there is no obvious causal relationship, between management history and where fires burned. However, there are numerous anecdotal examples of where previous fires, both prescribed and wildfires, and other land management actions had a dramatic effect on the spread and intensity of individual fires in 2000.

Wildland fires, even large wildland fires, are an inherent and integral part of the Bitterroot and

the Northern Rockies. Fire by itself is neither good or bad. It is the effects of wildland fires that determine whether people consider them to be desirable or catastrophic. As discussed further in the next sections of this report, some, but not all, of the fires of 2000 caused significant impacts to people, communities, and the environment.

Valley Complex. (photo by Karen Wattenmaker)

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Figure 13: Burn severity statistics for the Bitterroot National Forest (BNF), BNF lands in Montana (MT), Idaho (ID), and on State and private land in Ravalli County, Montana (numbers rounded ot the nearest hundred acres).

Land Ownership	High Severity Burn		Moderatre Severity Burn		Low Severity Burn		Total Burned Area	
	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent
BNF - All	85,200	5	55,900	4	165,900	11	307,000	20
BNF-ID(1)	7,600	2	9,200	2	46,700	10	63,500	14
BNF - MT	77,600	7	46,700	4	119,200	11	243,500	22
State and Private	15,800	32	15,600	32	17,600	36	49,000	unest
Total All Ownership	101,000	28	71,500	20	183,500	52	356,000	unest

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Figure 14: Burn severity statistics for various categories of land for the Montana portions of the Bitterroot National Forest (numbers rounded to nearest hundred acres).

Land Category	High Severity		Moderate Severity		Low Severity		Total Burned	
	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent
Wilderness	11,700	4	6,100	2	14,000	5	31,800	11
Selway-Bitterroot Wilderness	200	0	100	0	3,200	1	3,500	1
Anaconda Pintler Wilderness	11,500	28	6,000	15	10,800	26	28,300	69
Non-Wilderness	65,900	8	40,600	5	105,200	13	211,700	26
Commerci-al Forest Land (2)	45,600	9	31,200	7	72,700	15	149,500	31
Roaded Land	(2) 36,400	9	25,400	6	59,500	14	122,400	29
Roadless Land	29,500	7	14,200	4	45,600	11	89,300	22