



Fire!



Source: www.dnr.wa.gov/htdocs/rp/prevent.htm

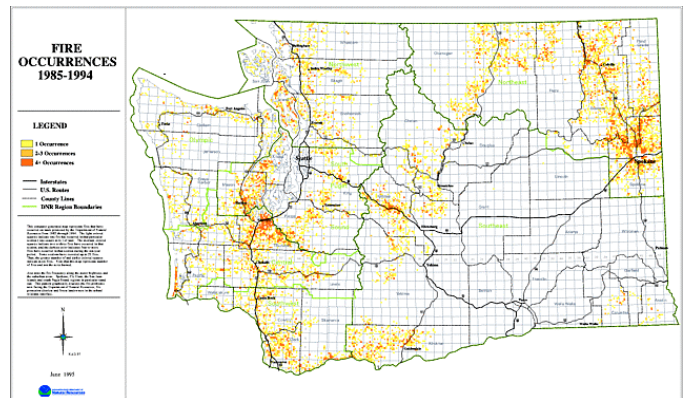
Timberland investors and potential investors often ask about the impact of forest fires on timberland investments. Each summer, the evening news carries images of spectacular fires. However, the number, intensity and size of fires varies across the country and among ownership types. Fires on public lands (for example, National Forests and lands owned by the USDI Bureau of Public Lands) are often larger than those on private lands. In addition, some of the most spectacular fires occur on lands that support brush and small trees, but are not investment-grade timberlands—fire-fighting agencies have generally replace the term *forest fire* with the term *wildland fire*.

How serious is the forest fire issue? There are two components to this question: fire occurrence and fire damage.

Fire Occurrence

The number and size of fires varies by region across the United States, determined in part by climate conditions and population density.

- More people, more fires. Washington’s web site contains a map showing fire locations between 1985 and 1994, and they are clustered around populated areas:



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The Maine Forest Service was busy during the second weekend in April 2004 putting out 20 fires, most caused by fire escaping from homeowners burning debris.

- More people, smaller fires. While more people mean more fires, higher population density implies fires are spotted sooner, so responses are quicker. Higher population densities imply more roads, providing easier access for fire fighters.
- Drier climate, more fires. Southern California burns annually because of climate conditions—dry climate and Santa Anna winds. Fires are less frequent in Northeast.

Table 1 presents wildland fire data for 1980 through 2002 for the United States.

Table 1. Total Forest Fire Acres, 1980 - 2002

Year	Number of Fires ¹	Acres Burned	Acres/Fire	Acres Burned as % of Forest Acres ²
1980	234,892	5,260,825	22	0.7%
1981	249,370	4,814,206	19	0.7%
1982	174,755	2,382,036	14	0.3%
1983	161,649	5,080,553	31	0.7%
1984	118,636	2,266,134	19	0.3%
1985	133,840	4,434,748	33	0.6%
1986	139,980	3,308,133	24	0.4%
1987	143,877	4,152,575	29	0.6%
1988	154,573	7,398,889	48	1.0%
1989	121,714	3,261,732	27	0.4%
1990	122,763	5,452,874	44	0.7%
1991	116,953	2,237,714	19	0.3%
1992	103,830	2,457,665	24	0.3%
1993	97,031	2,310,420	24	0.3%
1994	114,049	4,724,014	41	0.6%
1995	130,019	2,315,730	18	0.3%
1996	115,025	6,701,390	58	0.9%
1997	89,517	3,672,616	41	0.5%
1998	81,043	2,329,709	29	0.3%
1999	93,702	5,661,976	60	0.8%
2000	122,827	8,422,237	69	1.1%
2001	84,079	3,555,138	42	0.5%
2002	88,458	6,937,584	78	0.9%
Average	130,112	4,310,387	33	0.6%
Average 1960-2002	133,521	4,111,643	31	0.6%

¹Fire data from <http://www.nifc.gov/stats/wildlandfirestats.html>. These figures are based on end-of-year reports compiled by all wildland fire agencies after each fire season, and are updated by March of each year. The agencies include: Bureau of Land Management, Bureau of Indian Affairs, National Park Service, US Fish and Wildlife Service, USDA Forest Service and all State Lands.

²Forest Acres from Powell, et al, 1993, and Smith, 2000.

The average number of wildland acres burned each year during that period was just over 4.3 million acres. (Note that the average since 1960 is not significantly differently different.) This sounds like a tremendous number of acres, but note that the average fire size is only 33 acres. This table includes spectacular fires on public lands in the West, such as the thousands of acres burned in the Yellowstone fires of 1988 and the brush fires in southern California each year. Fires on private lands tend to be smaller and less spectacular because access is better and suppression is more immediate.

On average, about one half of one percent of total forest land in the United States burns each year.

There are regions where fires are more likely and more common. The table above is assembled annually by the NICC from data reported by states. Collecting that state data quickly is challenging. No fire statistics are easily to find on the web sites for Maine, New Hampshire, Vermont or New York. Southern and western state web sites contain far more extensive information on fires. Most contain extensive fire histories. Surprisingly, Idaho’s and Colorado’s sites have extensive fire information, but no fire histories that can be found in a few seconds of browsing the web site.

Table 2 shows data from some individual states. Data are maintained by each state’s forestry agency and each state reports its data differently. The length of the data series available varies from four years available from South Carolina to nearly 70 years for Arkansas. A more intensive research effort would be able to fill in the missing data.

Table 2. State Fire Statistics

Year	AR			CA			FL			GA			MS		
	Number of Fires	Acres Burned	Acres/Fire	Number of Fires	Acres Burned	Acres/Fire	Number of Fires	Acres Burned	Acres/Fire	Number of Fires	Acres Burned	Acres/Fire	Number of Fires	Acres Burned	Acres/Fire
1990	2,577	33,161	13	7,283	212,142	29	6,665	249,912	37						
1991	2,034	27,278	13	6,238	23,154	4	3,985	86,948	22						
1992	1,670	20,696	12	7,939	191,490	24	4,324	82,230	19	10,877	41,297	3.8			
1993	2,128	26,589	12	6,988	122,606	18	4,680	80,484	17	5,482	20,469	3.7			
1994	1,473	23,294	16	7,207	140,792	20	3,600	180,048	50	10,269	36,773	3.6			
1995	3,460	52,502	15	6,601	121,198	18	3,343	48,586	15	5,911	18,920	3.2			
1996	2,327	41,035	18	7,237	232,624	32	4,180	93,849	22	10,669	40,062	3.8			
1997	1,267	13,921	11	6,835	57,788	8	4,027	146,122	36	7,224	22,998	3.2			
1998	1,489	15,557	10	5,227	92,456	18	4,899	506,970	103	6,579	36,660	5.6	3,241	35,443	11
1999	2,563	24,929	10	7,562	285,272	38	5,645	355,239	63	11,005	47,456	4.3	3,561	42,934	12
2000	2,705	34,717	13	5,177	72,718	14	6,723	210,851	31	11,005	47,456	4.3	6,355	77,614	12
2001	1,374	16,342	12	6,223	90,985	15	4,805	403,737	84	11,005	47,456	4.3	4,812	65,037	14
2002				5,759	112,810	20	3,065	56,835	19	11,005	47,456	4.3	2,726	34,514	13
Average	2,089	27,502	13	6,637	135,080	20	4,611	192,447	42	9,185	37,000	4.0	4,139	51,108	12

Year	MT			NC			OR			SC			WA		
	Number of Fires	Acres Burned	Acres/Fire	Number of Fires	Acres Burned	Acres/Fire	Number of Fires	Acres Burned	Acres/Fire	Number of Fires	Acres Burned	Acres/Fire	Number of Fires	Acres Burned	Acres/Fire
1990				4,037	26,193	6.5	1,116	10,834	10				1,142	8,762	8
1991				5,051	24,336	4.8	1,172	6,982	6				174	40,368	232
1992				5,721	23,952	4.2	1,679	26,718	16				1,084	10,003	9
1993				4,793	25,334	5.3	820	2,848	3				641	2,203	3
1994	753	39,226	52	5,809	26,625	4.6	1,447	28,308	20				1,212	79,408	66
1995	251	5,159	21	5,296	21,253	4.0	997	4,803	5						
1996	433	119,536	276	4,272	15,963	3.7	1,087	24,808	23						
1997	204	3,419	17	4,539	16,274	3.6	794	1,410	2						
1998	375	36,588	98	4,317	15,699	3.6	966	2,682	3						
1999	467	87,356	187	6,244	28,298	4.5	1,171	9,528	8	6,615	35,156	5.3			
2000	541	167,584	310	4,949	25,146	5.1	904	10,875	12	4,715	21,399	4.5			
2001	334	16,758	50	8,128	28,732	3.5	1,261	51,438	41	5,283	29,934	5.7			
2002	322	28,394	88	5,618	28,215	5.0	1,178	99,166	84	6,378	49,372	7.7			
Average	409	56,002	137	5,290	23,540	4.4	1,122	21,569	19	5,748	33,965	5.9	851	28,149	33

In general, the southern states have experienced smaller fires than the US average. Florida has had slightly bigger fires, but this data series coincides with a 5-year drought period in the late 1990s and early 2000s. 1998 saw a number of very large, spectacular forest fires in heavily settled regions of the state, where the average fire was four times larger than the national average.

Fire Damage

A fire does not necessarily destroy all the value of a forest. The damage done to a tree depends on the intensity (heat and duration of the exposure to that heat) of the fire. Foresters sometimes use prescribed burns—carefully set and controlled fires—to control understory vegetation. These burns serve two functions: they reduce competition for nutrients in the soil by killing the understory brush and they reduce the amount of fuel available to wildfires. Prescribed burns do little damage to older trees. The key is to keep the fire on the ground and away from the needles in the tree crown.

Wildfires can be destructive because they are not under control and can be hot enough to kill trees. The intensity of the fire depends on fuel and wind conditions. A slow moving fire in a high fuel area will be very destructive. A fast moving fire in an area of low fuel will not cause as much damage. The spectacular news films of fires in residential areas are not representative of conditions in most pine plantations.

Fires do not normally burn a mature tree to a pile of ashes. Instead, the heat kills the tree and the fire may char the bark and sometimes a thin layer of wood under the bark if it burns the bark away. If the tree is harvested soon after the fire, the wood is still usable, so some value may be recovered. However, there will be a layer of charcoal on the outside of the tree. The depth of the layer and the height it reaches up the tree will depend on the strength of the fire.

Almost any fire will kill seedlings and saplings. Any recently established stands caught in a fire will need to be replaced.

Wood Recovery from Burned Trees

Much of the value is recoverable from sawtimber-sized trees. The burned wood is on the round, outside part of the log. The effect is to make the log smaller—the charcoal must be removed from the outside inch or so of the log, then the slabs can be chipped or sawn off. The interior of the log will not be charred and will still make lumber. The mills will turn black as charcoal dust spreads, and the lumber will probably be stained black.

However, sawmills are designed to remove bark, then chip or saw off the slabs. They are not designed to remove charcoal between the debarking and the chipping. As a result, the chips/slabs being removed contain significant quantities of charcoal and are not useable as pulp chips.

The ability to recover value from pulpwood sized trees is more limited. Charcoal getting into the pulp process will weaken and discolor the paper or paperboard. A certain amount of burned wood can be used in the pulping process, but the supply of burned wood vastly exceeds the demand.

Summary

There are an average of 130,000 wildland fires in the United States each year. Each fire averages just over 30 acres in size. Most of these fires do not kill all the trees in the burned area. The chances that a particular stand of timber will be hit by a very large, very hot fire are very small. But, if one does, your trees will be toast!

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