

General Summary

Since 1976, 1,692 firefighter entrapments have been reported during 240 incidents (Figure 2), an average of 70 entrapments a year. Some wildfires had more than one incident, such as the Marble Cone Fire (California, 1977), Lake Mountain (Idaho, 1985), 49'er (California, 1988), Altamont (California, 1988), Canyon Creek (Montana, 1988), Eagle (California, 1989), Hour Glass (Colorado, 1994), IL Complex (Nevada, 1994), Logan (California, 1996), and Cleveland (Washington, 1998). Figure 2 also illustrates shelter deployments throughout the period (1,050 or an average of 43 per year). Burnovers with fatalities averaged four a year, for a total of 105 burnovers. The largest entrapment occurred on the 1988 Butte Fire in Idaho when 118

firefighters were threatened. The incident with the most fire shelters deployed was on the 1988 Canyon Creek Fire in Montana (Elk Creek Zone, 107 shelters deployed). The most fatalities (14) occurred on the 1994 South Canyon Fire in Colorado.

Figure 3 compares entrapments, shelter deployments, and fatalities by NWCG geographic region. This comparison is by numbers of personnel. The Eastern Basin Region includes the 1985 Butte and Lake Mountain (Idaho) incidents, accounting for the high number of entrapments and shelter deployments.

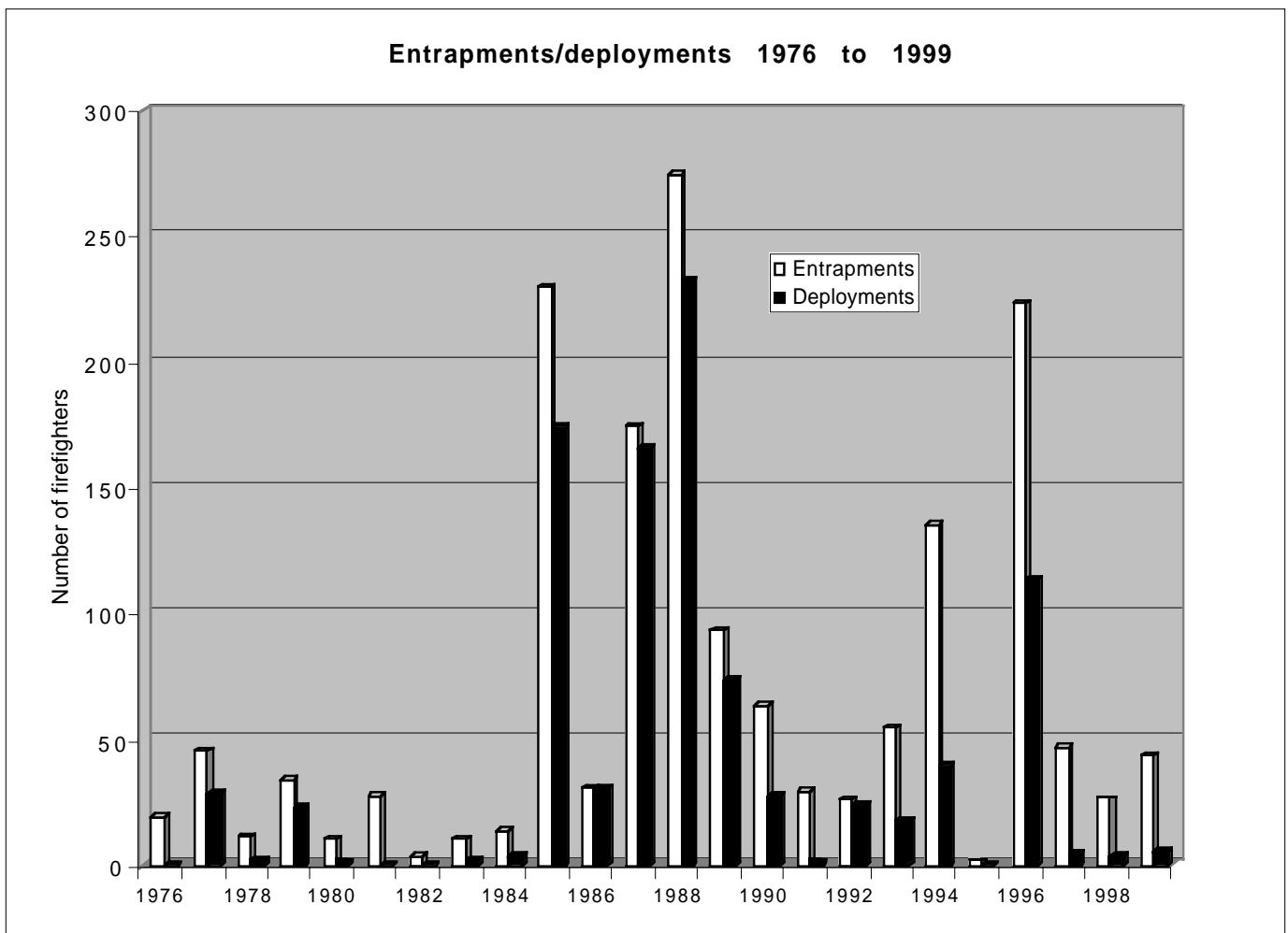


Figure 2—Comparison by year, from 1976 to 1999, of the number of wildland fire personnel entrapped and fire shelters deployed.

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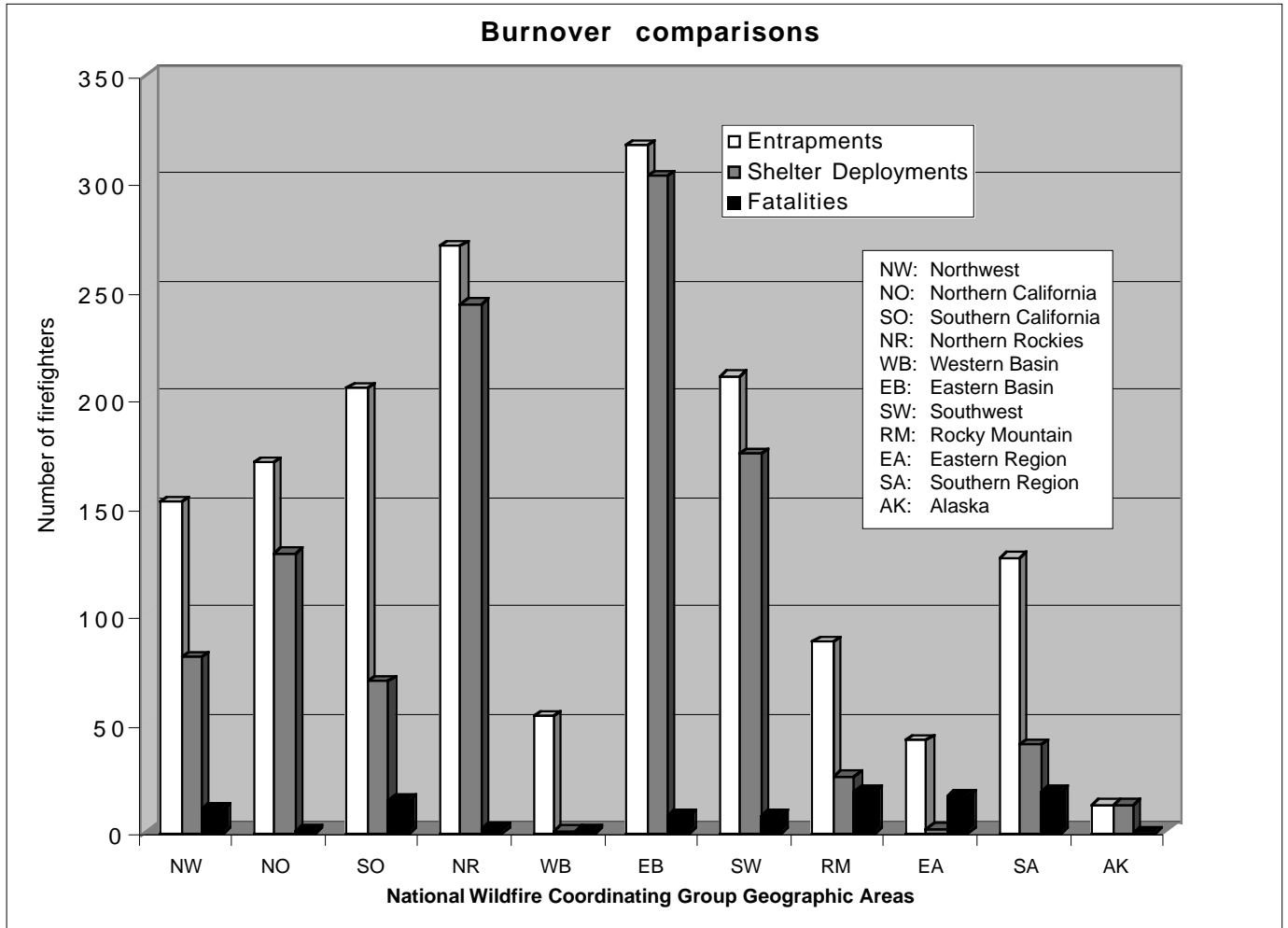


Figure 3—Entrapments, shelter deployments, and burnover fatalities by each National Wildfire Coordinating Group geographic area.

Entrapments

Of the fires with entrapments, 51 were Type 1 or 2, 31 were Type 3, and 47 were Type 4 or 5 (Figure 4). The most complex incidents, typically involving the largest acreages, are Type 1. The least complex incidents are Type 5. Eleven entrapment incidents occurred during prescribed burns. Four of those incidents had fatalities. Nearly a third (67) of all entrapments occurred on fires at the wildland/urban interface.

Figure 5 illustrates the types of equipment and crews involved in entrapment situations. Forty burnovers (19 at the wildland/urban interface) involved engines, 22 involved dozers, and 31 involved tractor/plow units. Of the organized crews that were entrapped, Type 1 crews were involved in 13 incidents (25 percent) and Type 2 crews were involved in 52 incidents (75 percent). Of the organized crews available annually, about 14 percent are Type 1 and the rest (including inmate crews) are Type 2.

Figure 6 shows agencies with overall jurisdiction in areas where the entrapment incidents occurred. The Forest Service had overall jurisdiction in 70 entrapment incidents, States (except California) had overall jurisdiction in 55 incidents, the California Department of Forestry had overall jurisdiction in 37 incidents, and the Bureau of Land Management had overall jurisdiction in 18 incidents. The Forest Service was the primary employer of persons entrapped during 54 incidents, the States were the primary employers of persons entrapped during 38 incidents, and the California Department of Forestry was the primary employer of persons entrapped during 29 incidents.

No significant trend was noted by examining fuel types. Fuel types corresponded with the geographic area and occurred in all 13 Fire Behavior Prediction System fuel models. Weather information was not readily available.

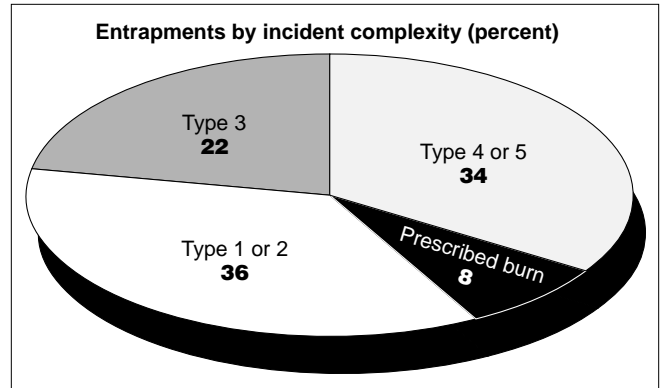


Figure 4—Percentages of entrapments by type of incident complexity.

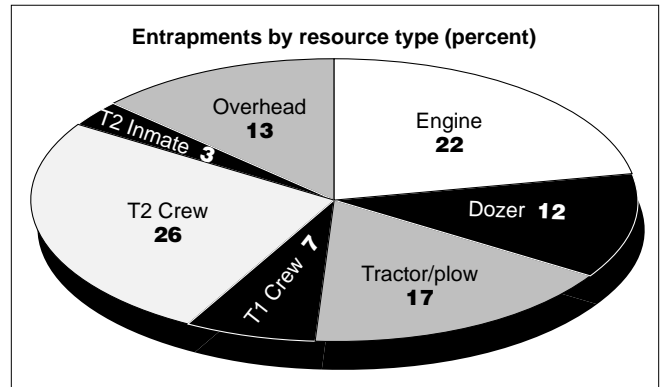


Figure 5—Percentages of entrapments by resource type.

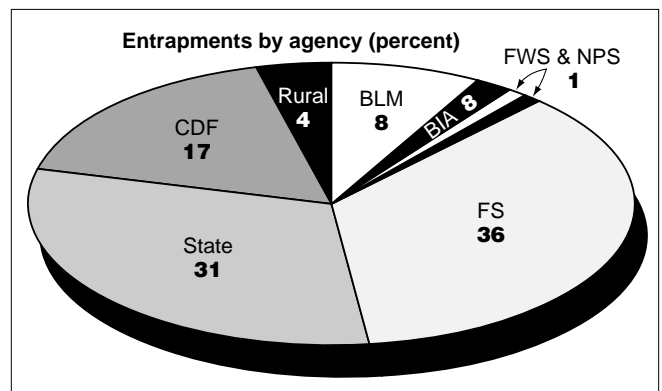


Figure 6—Percentages of entrapments by responsible agency.

Fire Shelter Deployments

One thousand and fifty firefighters deployed fire shelters in 109 incidents during the study period. Figure 7 shows the percentages of incidents by incident complexity. A majority (70 percent) of the shelter deployment incidents occurred on fires managed by incident management teams (incident Types 1, 2, or 3). Initial attack accounted for 23 percent of the reported deployments. The remainder were prescribed burns. Several incidents were identified in which two people shared one shelter and survived (Boyd

1985, Florida; Madison Gulch 1988, Montana; Early Bird 1988, Montana; Wampee Bay 1988, Florida; Clover 1988, Wyoming; Sheep Mt. 1990, Oregon). Figure 8 illustrates the type of firefighting resources involved in the incidents. Over half (54 percent) of the shelter deployments involved fire crews. Another 28 percent involved engines, dozers, or tractor/plows. Single resources, such as overhead, accounted for the remaining numbers.

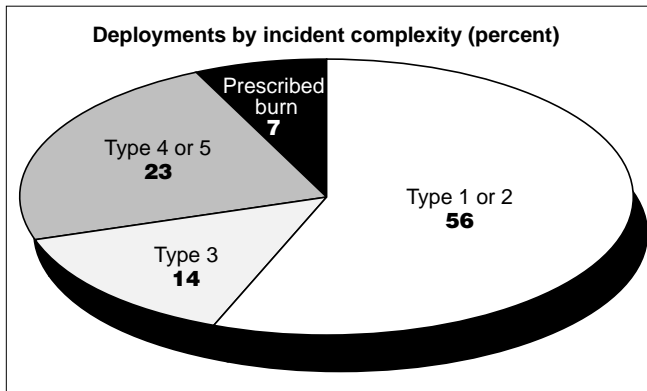


Figure 7—Type of incident complexity for fire shelter deployments.

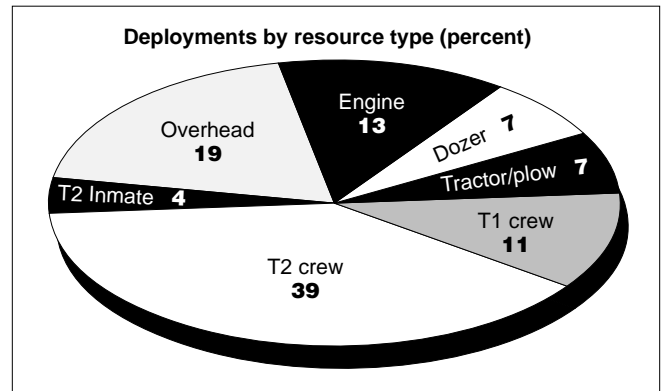


Figure 8—Resources involved in fire shelter deployments.

Fatalities

During the study period, fatalities occurred during 28 incidents. A total of 105 fatalities were reported, about four per year. Figure 9 shows the percent of fatalities by the complexity of the incident. Twelve incidents (43 percent) occurred on Type 1, 2, or 3 fires. Twelve incidents (43 percent) occurred during initial attack. Four incidents (14 percent) occurred during prescribed fires. Figure 10 shows the number of fatalities by resource type. Engines, dozers, and tractor/plows were involved in 14 incidents with

fatalities (56 percent). Type 1 crews were involved in two incidents (7 percent) with fatalities: the Battlement and South Canyon fires. Type 2 crews were involved in six incidents (24 percent) with fatalities.

Proportionately, Type 1 crews were involved in twice as many burnovers as Type 2 crews. Type 1 crews may be exposed to more situations that could lead to entrapments than Type 2 crews.

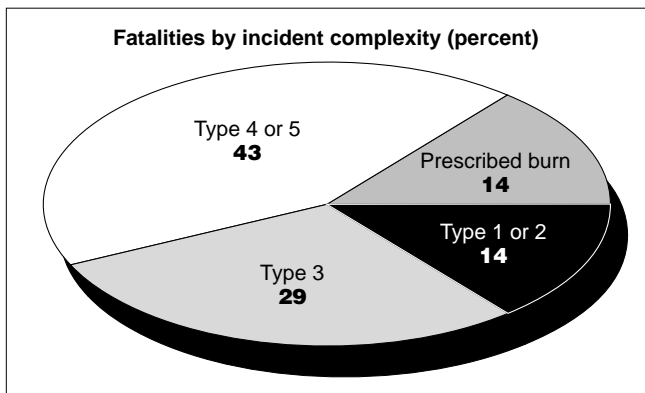


Figure 9—Incident complexity in firefighter fatality burnovers.

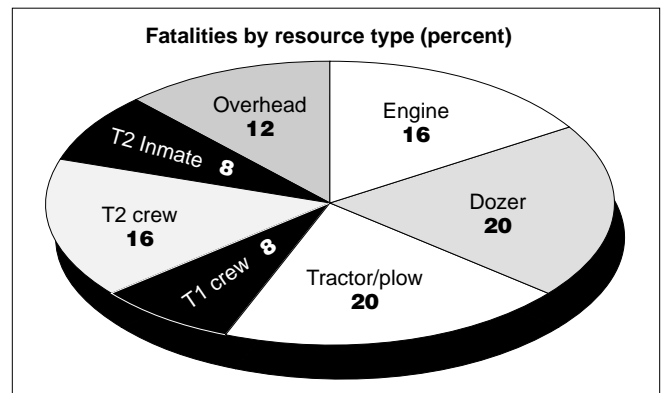


Figure 10—Fatalities by resource type.