

Ecosystem Workforce Program
WORKING PAPER NUMBER 31
SUMMER 2011



Fire Suppression Costs and Impacts of the 2008 Wildfires in Trinity County, California

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Acknowledgements

This research was made possible with support from Joint Fire Sciences Agreement # 09-JV-11242309-069. We thank Krista Gebert for obtaining data for this report, Kate MacFarland for editing, and Michelle Medley-Daniel for assistance with the data.

All photos by U.S. Forest Service.

Map by Liz Podowski.

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Although wildfire costs are commonly discussed in natural resource policy and research, how wildfire suppression spending affects local economies has received relatively little attention. Wildfires can have multiple and complex impacts on local economies. Emergency response can create work stoppages in natural resource sectors and sectors that rely on natural resources. Poor air quality and risks to human life and property can reduce tourism and recreation in areas affected by wildfire. In contrast, wildfires can support local businesses through suppression contracts and procurement of goods and services needed to support the suppression effort. How and where suppression spending is distributed may determine whether the direct economic impacts of a wildfire are more negative or positive.

The purpose of this paper is to investigate how the USDA Forest Service's wildfire suppression effort in Trinity County, California, during the summer of 2008 impacted the local economy and workforce. We investigated the geographic distribution of suppression spending for the 2008 Trinity County wildfires and examined employment and wage data for Trinity County to begin understanding the economic impacts of large wildfires on local communities. The case of Trinity County will help to guide a larger systematic study of the economic impacts of wildfire on a panel of over 360 large wildfires from across the United States.

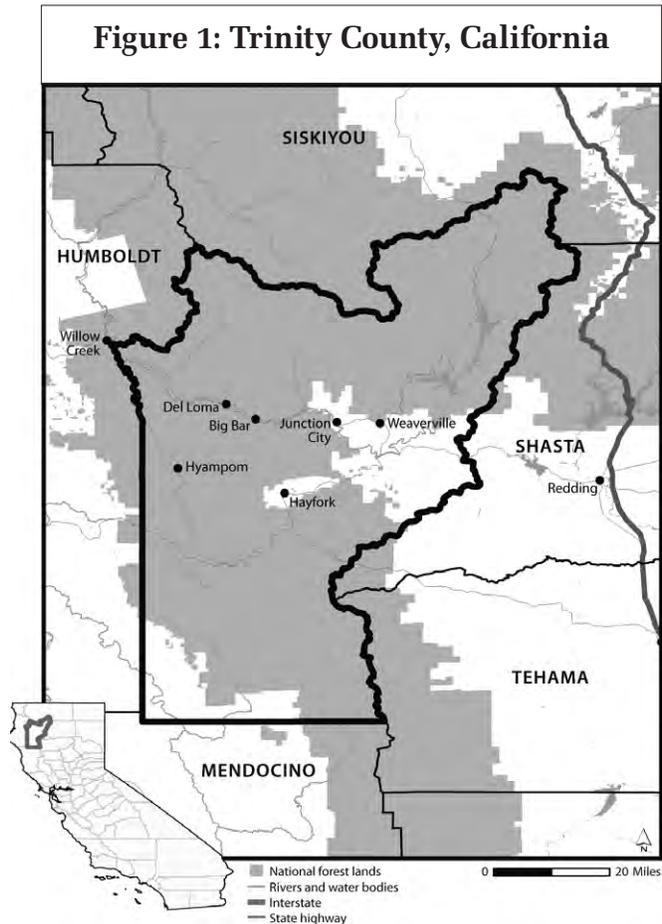
Approach

We gathered data on fire characteristics and suppression costs for the 2008 Trinity County wildfires from the National Interagency Fire Management Information Database and Federal Foundation Information System. We examined the cost structure and spatial distribution of suppression expenditures to begin to develop an understanding of how the suppression effort might have affected the local economy. We use this understanding to propose several important research questions about the economic effects of wildfire suppression that can be answered by linking suppression data with employment and wage data from the Bureau of Labor Statistics.

The 2008 Trinity County wildlife complexes

The USDA Forest Service and the Bureau of Land Management manage 89 percent of the land in Trinity County, most of which is classified as severely departed from its historic fire regime. On June 20, 2008, more than 3,000 lightning strikes sparked over 100 wildfires in Trinity and western Siskiyou counties in a matter of hours. Although most of these fires were quickly extinguished or failed to grow, thirteen large wildfires burned in Trinity County from late June through October 2008 (Figure 1). Two distinct clusters of wildfire activity occurred on the Shasta-Trinity National Forest. One cluster of eight wildfires burned along the Trinity River recreation corridor near the communities of Big Bar, Del Loma, and Junction City. A second cluster of wildfires occurred in sparsely populated southeastern Trinity County near the Yolla Bolly Wilderness and the municipal watershed for several Humboldt Bay communities. Several other wildfires occurred in

Figure 1: Trinity County, California



the Trinity Alps and Marble Mountains Wilderness Areas, near the community of Hyampom, in western Siskiyou County on the Klamath National Forest, and in Tehama County just across the border from the southeastern Trinity County wildfires. Wildfires burning in the region shared challenges of isolation from transportation networks and difficult terrain. The thirteen Trinity County wildfires burned across approximately 250,000 acres and cost the U.S. Forest Service over \$150 million in suppression expenses.

Trinity County wildfire suppression spending patterns

Expenditure records indicated that nearly half of all costs for these thirteen wildfires were spent on private suppression contracting (Table 1) and that 40 percent of those expenditures were to vendors located in or adjacent to Trinity County (only 7 percent was contracted to firms located in Trinity County). Federal personnel costs accounted for roughly a quarter of the total expenditures, and cooperative agreements with state suppression agencies accounted for another 15 percent. Local and regional expenditures were highest for private suppression services and federal personnel, and relatively negligible for cooperative agreements and flying contracts. The locale of expenditures for supplies and other services are more challenging to quantify as the locale for the

majority of expenses in this category are classified by the location of the credit card company that processed the expenditure rather than the location of the vendor. Detailed analysis of transaction records indicated that 16 percent of credit card purchases for supplies and other services to support the suppression effort were spent in Trinity County and 37 percent were spent in adjacent counties.

Private-sector vendors from more than 600 counties across the country received payments for goods or services employed in suppression of the Trinity County wildfires. Vendors and government units from Trinity and Shasta counties were the most common recipients of federal suppression expenses (Table 2). Vendors from Shasta County, California, Deschutes County, Oregon, and Jackson County, Oregon, provided the most private nonaerial suppression services, whereas more specialized flying contracts were mostly awarded to vendors from three counties in Oregon (Table 3). Federal personnel were employed from 550 counties across the country, most commonly from Trinity and adjacent counties. Cooperative agreements were used to employ resources with state and local agencies located in seventy-three counties across the country, most prominently from California, Colorado, and Alaska. Several local and regional contractors and suppliers were awarded suppression contracts or were the

Table 1: 2008 Trinity County wildfire suppression expenditures

Forest Service Expenditure Category	Total (\$)	Expenditures			
		Total (%)	Regional ¹ (%)	Local ² (%)	Unknown locale (%)
Private Suppression Services ³	\$73,087,972	47	40	7	<1
Federal Personnel	\$33,577,770	22	19	7	12
Cooperative Agreements	\$23,729,526	15	2	1	1
Flying Contracts	\$13,864,798	9	3	0	0
Others ⁴ (e.g., supplies, travel)	\$11,317,806	7	33	10	28
Total	\$155,577,872	100	23	5	3

¹ All expenditures sourced from Trinity, Humboldt, Mendocino, Shasta, Siskiyou, or Tehama counties, California.

² Only expenditures sourced from Trinity County, California.

³ All contracted services not otherwise classified.

⁴ All other procurement, predominately materials and supplies.

Table 2: Top ten counties with private vendors or government units receiving payments for suppression-related activities in the 2008 Trinity County wildfires

County	Total Expenditures	Private Suppression Services	Personnel	Cooperative Agreements	Flying Contracts	Other Expenses
Shasta, CA	\$13,912,337	83%	14%	0%	2%	0%
Maricopa, AZ ¹	\$9,755,036	9%	3%	12%	7%	69%
Trinity, CA	\$7,820,771	66%	29%	4%	0%	0%
Jackson, OR	\$7,305,804	76%	1%	0%	23%	0%
Deschutes, OR	\$6,211,732	98%	2%	0%	0%	0%
Siskiyou, CA	\$5,996,719	84%	14%	0%	1%	1%
Humboldt, CA	\$5,461,036	82%	17%	0%	0%	1%
Sacramento, CA	\$5,050,290	3%	4%	92%	0%	2%
Los Angeles, CA	\$3,055,843	0%	25%	72%	2%	1%
Tehama, CA	\$2,967,786	95%	3%	1%	1%	0%

¹ Maricopa, Arizona, is the location of Bank of America, the processor for credit card purchases made by federal personnel and charged to Trinity County wildfire accounts. Analysis of specific credit card transactions attributed to Maricopa County, Arizona, indicated that 53 percent were related to purchases with vendors located in Trinity County or its adjacent counties (i.e., Humboldt, Mendocino, Shasta, Siskiyou, or Tehama).

Table 3: Top five counties with private vendors or government units receiving payments for suppression-related activities by expenditure category

Cooperative Agreements		Flying Contracts		Personnel	
County	Amount*	County	Amount*	County	Amount*
Sacramento, CA	\$4.6	Benton, OR	\$1.8	Trinity, CA	\$2.3
Larimer, CO	\$2.8	Jackson, OR	\$1.7	Shasta, CA	\$2.0
Los Angeles, CA	\$2.2	Josephine, OR	\$1.1	Humboldt, CA	\$0.9
Anchorage, AK	\$2.0	Livingston, MI	\$1.1	Siskiyou, CA	\$0.9
Ventura, CA	\$1.6	Lake, OR	\$1.1	El Dorado, CA	\$0.8
Private Suppression Services		Other Expenses			
County	Amount*	County	Amount*		
Shasta, CA	\$11.5	Maricopa, AZ ¹	\$6.8		
Deschutes, OR	\$6.1	Arlington, VA	\$1.5		
Jackson, OR	\$5.5	Ada, ID	\$1.2		
Trinity, CA	\$5.2	Montgomery, MD	\$0.1		
Siskiyou, CA	\$5.1	Hennepin, MN	\$0.1		

¹ Maricopa, Arizona, is the location of Bank of America, the processor for credit card purchases made by federal personnel and charged to Trinity County wildfire accounts. Analysis of specific credit card transactions attributed to Maricopa County, Arizona, indicated that 53 percent were related to purchases with vendors located in Trinity County or its adjacent counties (i.e., Humboldt, Mendocino, Shasta, Siskiyou, or Tehama).

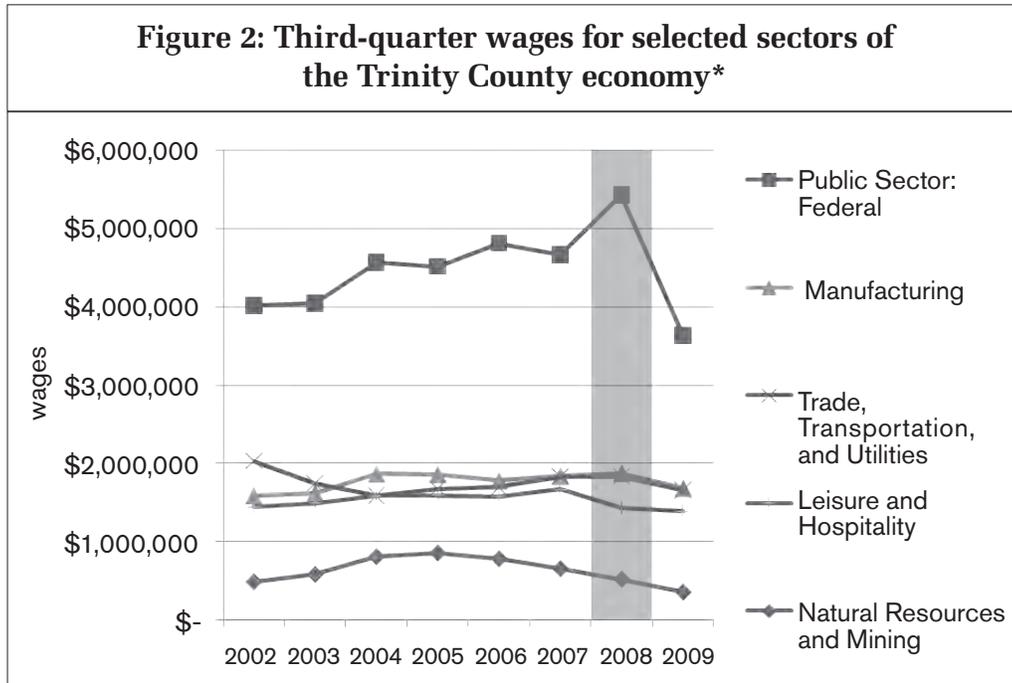
* All amounts are expressed in millions.

recipient of substantial credit card purchases to support the suppression effort.

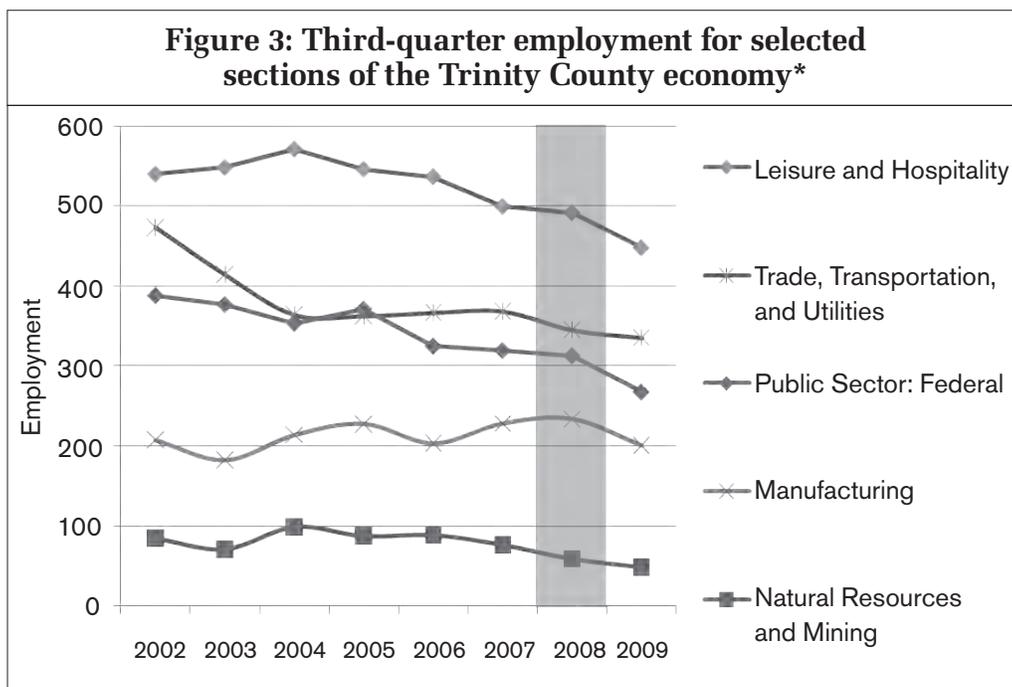
Employment and wages

Based on our analysis of federal suppression expenditure data, we would expect direct impacts to Trinity labor markets to be most acute in the public sector, reflecting increases in spending on federal em-

ployees. Given the duration, timing, and location of the wildfires, we expect impacts to private-sector natural resource, trade, and hospitality establishments to be more complex, reflecting positive impacts from suppression-related contracting and credit card purchases at local establishments, but negative impacts from lost natural resource work, recreation, and tourism.



* Shaded column indicates the 2008 wildfire period.



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Preliminary analysis of Bureau of Labor Statistics employment and wage data (Figures 2 and 3) indicates that although federal employment was virtually unchanged in the third quarter of 2008 (compared to the third quarter of 2007), federal wages increased 17 percent over the third quarter of 2007. Private-sector employment in natural resources dropped 23 percent over the third quarter 2007 and wages dropped 20 percent. Employment in trade sectors dropped 6 percent and wages in those sectors increased by 2 percent. Finally, employment in the leisure and hospitality sectors dropped 2 percent, although wages dropped 14 percent. These preliminary results support our expectations about potential complexities of the economic impacts of the 2008 Trinity County wildfires.

Conclusion

The case of the 2008 Trinity County, California, wildfires provides evidence that although the economic value created by wildfire suppression contracting is widely distributed across the country, it is likely to

be most concentrated in and around the physical location of the suppression effort. Nonetheless, Trinity County and its adjacent counties received less than a quarter of the \$155 million spent by the federal government on the suppression effort in Trinity County, and Trinity County received only about 5 percent of that economic input. The biggest inputs to Trinity County were for private suppression contracts and federal wages paid to suppression and coordinating staff members. It is also likely that procurement of goods and services paid by credit card provided a third major impact to the local economy. Bureau of Labor Statistics employment and wage data for Trinity County demonstrate a pattern that reflects the suppression expenditure patterns; a large increase in federal wages, a slight increase in the trade sectors, a slight to moderate drop in the leisure and hospitality sectors, and a substantial drop in natural resource sectors. Further investigation, however, is needed to identify whether those changes might be expected given larger regional, state, and national economic trends.



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