

COST ANALYSIS: WILDLAND FIRE CREWS AND ENGINES



The National Wildfire Suppression Association
preserving and protecting our environment

PREPARED BY

NWSA Board of Directors

Cost Committee

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INTRODUCTION

During the years 2000-12, federal government expenditures for wildfire suppression were over 1.4 billion dollars annually¹ and it is widely believed that the size and expense of wildfires will continue to increase. While most wildfires are readily contained through the efforts of relatively few resources, the largest fires require hundreds or even thousands of resources in order to achieve incident management objectives. Assets battling federally managed wildfires are categorized as either agency or contract resources. Agency forces include federal and cooperator (state, county, and local entity) resources. Contract resources are provided by the private sector. When wildfire suppression needs outstrip agency resource availability, private providers may be called upon to join the effort. As suppression-funding requirements escalate in an increasingly delicate fiscal environment, it is crucial to accurately assess resource costs relative to both incident cost and total taxpayer expenditures.

This analysis compares the costs of contract and agency hand crews and engines. Two components must be considered when comparing the costs of agency and contract resources. The first is the direct cost to the incident of that resource (those costs charged directly to the fire and thus included in the suppression cost of the incident). The second component comprises presuppression and indirect costs, which are not reflected in the daily charges to the incident but which the taxpayer shoulders nonetheless. Both components are included in the examination of the respective costs of each resource category.

About NWSA

The private sector constitutes approximately 40% of wildfire suppression forces in the United States. The National Wildfire Suppression Association (NWSA) represents 225 business owners whose companies supply incident response personnel, equipment, supplies, and services to federal, state, and local agencies on an as-needed basis. Capable of fielding 12,000 professionally trained personnel, member companies are dedicated to providing a wide variety of federally qualified resources to meet critical needs during our country's most devastating disasters such as wildfires, hurricanes, earthquakes, and aviation catastrophes. Wildfire incident response resources include twenty-person firefighting crews, timber faller modules, equipment operators, fire engines, tenders, dozers, and other specialized equipment as well as a full array of incident base services, equipment, and supplies that meet or exceed all National Wildfire Coordinating Group and federal standards. NWSA partners with the agencies, building productive relationships to ensure that private resources will be available when emergency incident demands exceed the agencies' response capacities.

BACKGROUND

Concern over rising suppression expenditures has led to examination of the drivers of those expenditures. The five federal agencies bearing responsibility for wildland fire suppression are the Forest Service (United States Department of Agriculture), the Bureau of Land Management, Bureau of Indian Affairs, Fish and Wildlife Service, and National Park Service (United States Department of Interior). Because the Forest Service incurs about 75% of the federal fire suppression expenditures,² much of scrutiny has been directed toward that agency. One of the foci of incident expenditure investigations has been the use and cost of the various resource categories. While the cost effectiveness of contract resources has been debated in agency studies and external literature, the published information does not provide an accurate comparison of the costs associated with each resource category considered. For instance, Donovan's work is often quoted in an attempt to compare the costs of Forest Service hand crews to contract hand crews. He notes that his analyses do not capture all Agency crew costs while at the same time pointing out that contract crew rates charged to an incident incorporate costs not included in agency rates.³ In direction to the Forest Service to "identify all direct and indirect costs associated with the different types of firefighting crews", the United States Department of

Agriculture Office of Inspector General “found that the Forest Service does not have reliable estimates of its firefighting crew costs” and rejected the Forest Service’s intention to apply Donovan’s methodology because of the omissions.⁴

The Professional Services Council, in its statement to the United States Senate Committee on Homeland Security and Governmental Affairs Subcommittee on Contracting Oversight, noted that the federal government’s cost comparison methodology is flawed, incomplete, and neglects to create a level comparison of the true costs of in-house workforces vs. contracted workforces. Specifically, the processes do not consider many of the costs associated with government forces while “For work that is contracted, the costs to the government are clear and are detailed in the proposals received and in the resulting contract(s).”⁵ Despite the OIG’s 2010 request that the Forest Service develop and utilize an accurate means of capturing all costs, no information regarding the progress of reaching that goal is publicly available at this time. This report more fully incorporates the cost factors that are traditionally absent from comparisons of expenditures for contract and agency resources.

The mission statement of the National Mobilization Guide for which all dispatchers perform their operational protocol, is as follows: “The principal mission of the National Interagency Coordination Center (NIFC) is the *cost-effective* and timely coordination of land management Agency successful emergency response for Wildland fire.”⁶

DATA

Resources Assessed

Although a variety of resource types, both government and private, are utilized on incidents, hand crews and engines are the most plentiful in both categories and are thus the subjects of this comparison.

1. Hand Crews

- a. Agency hand crews: Agency crews may be Type 1, Type 2 Initial Attack (Type 2IA), or Type 2. They may be federal or cooperator crews.
- b. Contract hand crews: Type 2IA hand crews are under national contracts. Region 6, comprising the states of Oregon and Washington, is the only region that contracts Type 2 hand crews. The Type 2 crews are administered under agreements through the Oregon Department of Forestry (ODF).

2. Engines

- a. Agency engines may be Types 3, 4, or 6 and may be federal or cooperator in origin.
- b. Contract engines may be Types 3, 4, or 6 (although there were no contracted Type 3 engines in the data collected for this analysis).

Data Sources

1. Incident Suite: Federal agencies utilize the Incident Suite (I-Suite) system to track the daily cost to the incident of each resource employed. This analysis includes costs from five fires. Table 1 details the incidents from which data was gleaned.

Table 1: Wildfires Included in I-Suite Data Analysis

Incident Name	Incident Number	Location	Size (acres)	Data Period
Williams Creek	OR-UPF-009071	Southwest OR	8,395	8/2/09-8/23/09
Wallow-East	AZ-ASF-110152	Arizona	529,825	5/31/11-6/22/11
West Riverside	MT-SWS-000056	Montana	3,800	8/22/11 – 9/6/11
Dollar Lake	OR-MHF-000382	Oregon	6,304	8/29/11 – 9/25/11
Motherlode	OR-MHF-000362	Oregon	2,360	9/5/11 – 9/18/11

2. Contractor surveys: NWSA surveyed well-established contractors to determine, as a percentage of revenue, the costs incurred in the course of business operations. Appendix A, Tables 3 and 4, contain presuppression/indirect cost figures gathered from hand crew and engine contractors, respectively.
3. Additional data sources: Information pertaining to specific items in this analysis was gathered from a variety of sources. Where used, this information is cited within the text of the report.

METHODOLOGY

To arrive at a cost analysis that provided consistent and reliable data, recorded I-Suite costs for each resource's first and last days were not counted, eliminating any partial work days or travel days. Additionally, to provide for a consistent method of data analysis, only periods of seven consecutive workdays for any given resource were included. All hand crews utilized during the report periods fitting the established criteria were included in the analysis. The engine analysis included the most costly agency and contract resources in order to provide a "worst case" comparison for each resource category.

Two Comparisons

1. Comparison I details the cost of each assessed resource based on direct daily incident costs taken from the collected I-Suite records.
2. Comparison II incorporates information not depicted in the I-Suite direct daily resource cost.
 - a. Resource costs recorded in I-Suite reflects the costs of those resources *to the specific incident*. Therefore, comparisons between the categories of resources based on I-Suite data alone, while revealing, do not provide a complete picture of the cost of agency resources.
 - b. The Congressional Budget Office found that analyses limited to daily rates alone are inadequate because the contractor rate includes the costs of training, equipment, benefits, and other nonlabor costs⁷ that are not included in an agency resource's direct daily rates. In fire parlance, these items are termed presuppression/indirect costs. The results of the contractor survey show that presuppression/indirect costs are an average of 30% of hand crew contractor revenue and 34% of engine contractor revenue.
 - (i) To provide a more accurate comparison across the resource categories, the second comparison incorporates the 30% and 34% presuppression/indirect cost into agency resource costs reported in the I-Suite data for hand crews and engines respectively.
 - (ii) Known costs that are in addition to the direct daily incident cost of a resource are specifically noted in the second comparison and added to the cost of those resources as appropriate.

COMPARISON I

Direct Cost Comparison Compiled from I-Suite Data

1. Hand Crews

- a. Figure 1 illustrates the average direct cost per incident assignment day for each hand crew type. There are no contract Type 1 hand crews. ODF is the only entity that contracts Type 2 hand crews.

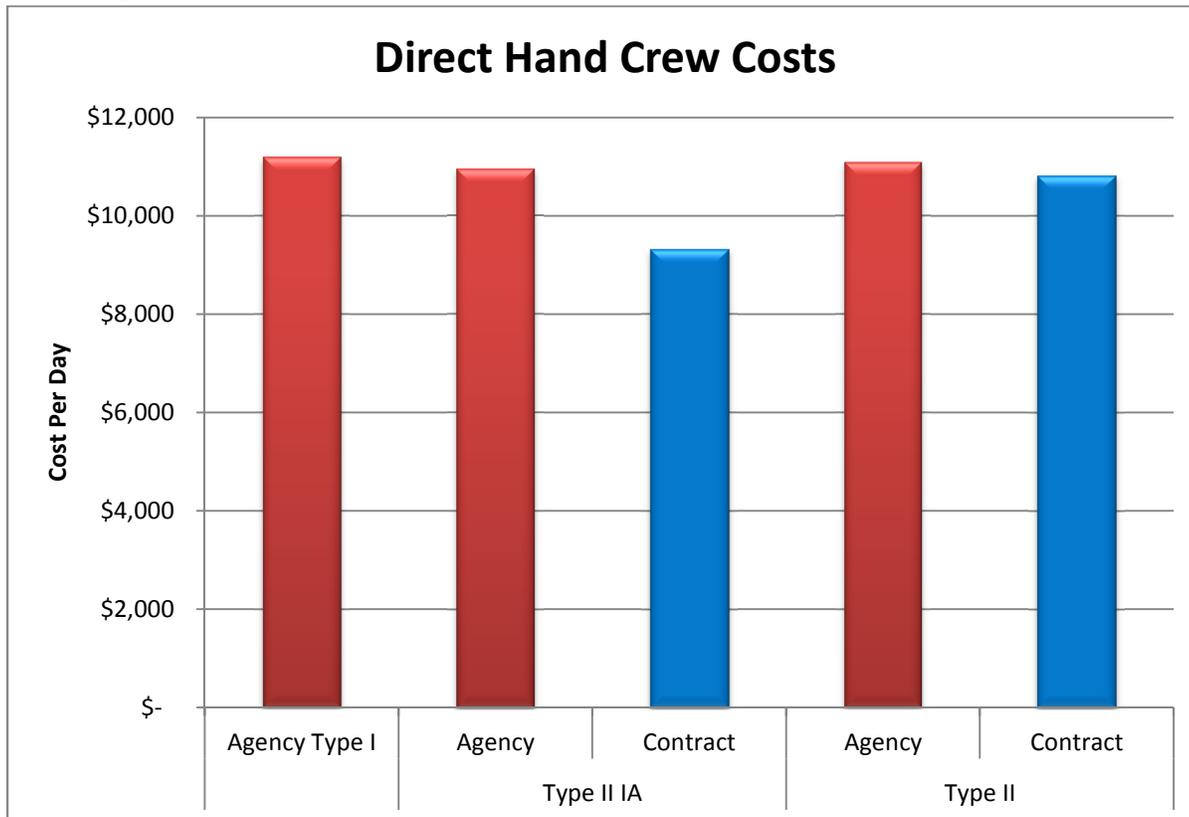


Figure 1: Agency and Contract Crew Direct Daily Cost Comparison

Summary Data For Direct Hand Crew Costs:

Crew Type	Avg Direct Cost Per Day
Agency Type 1	\$11,198
Agency Type II IA	\$10,947
Contract Type II IA	\$9,315
Agency Type II	\$11,091
Contractor Type II	\$10,815

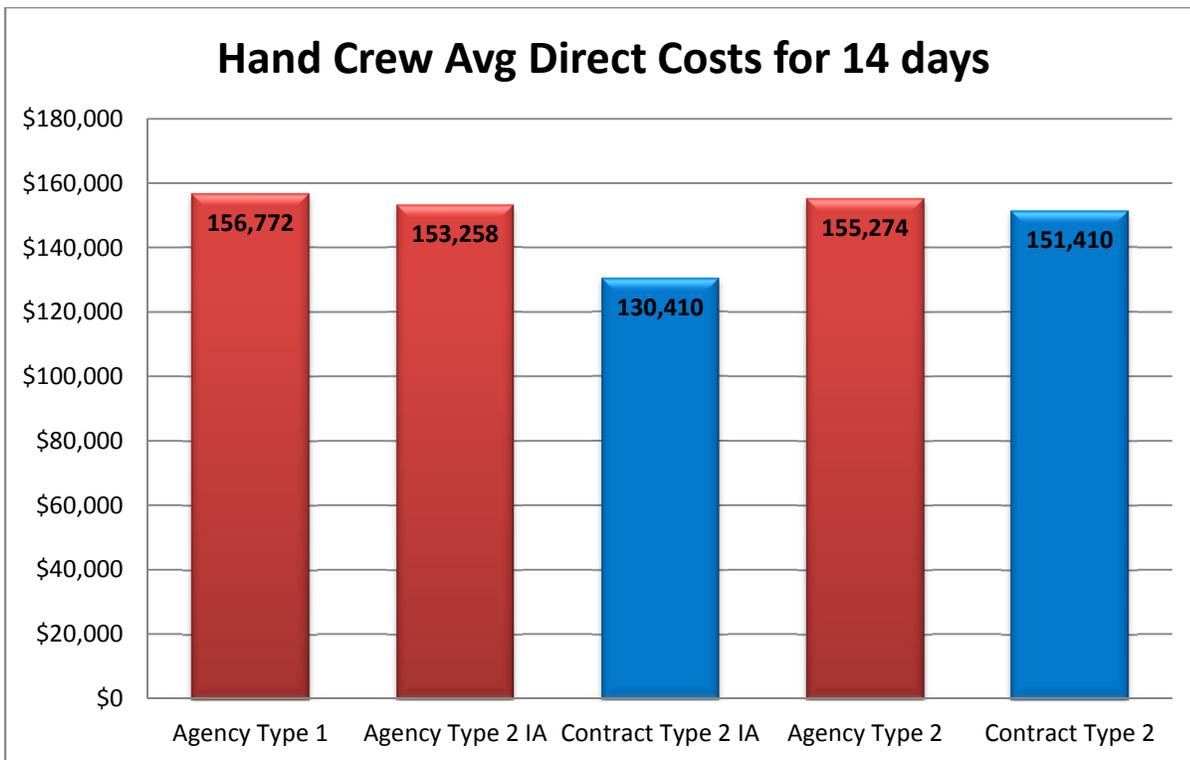


Figure 2: Agency and Contract Crew Direct 14 Day Cost Comparison

Summary Data For Direct Hand Crew 14 Day Costs:

Crew Type	Avg Direct Cost Per 14 Days
Agency Type 1	\$156,772
Agency Type II IA	\$153,258
Contract Type II IA	\$130,410
Agency Type II	\$155,274
Contractor Type II	\$151,410

2. Engines

a. Figure 2 depicts the average direct cost per incident assignment day for a type 6 engine. There were no contract Type 3 engines assigned to the incidents during the data periods studied.

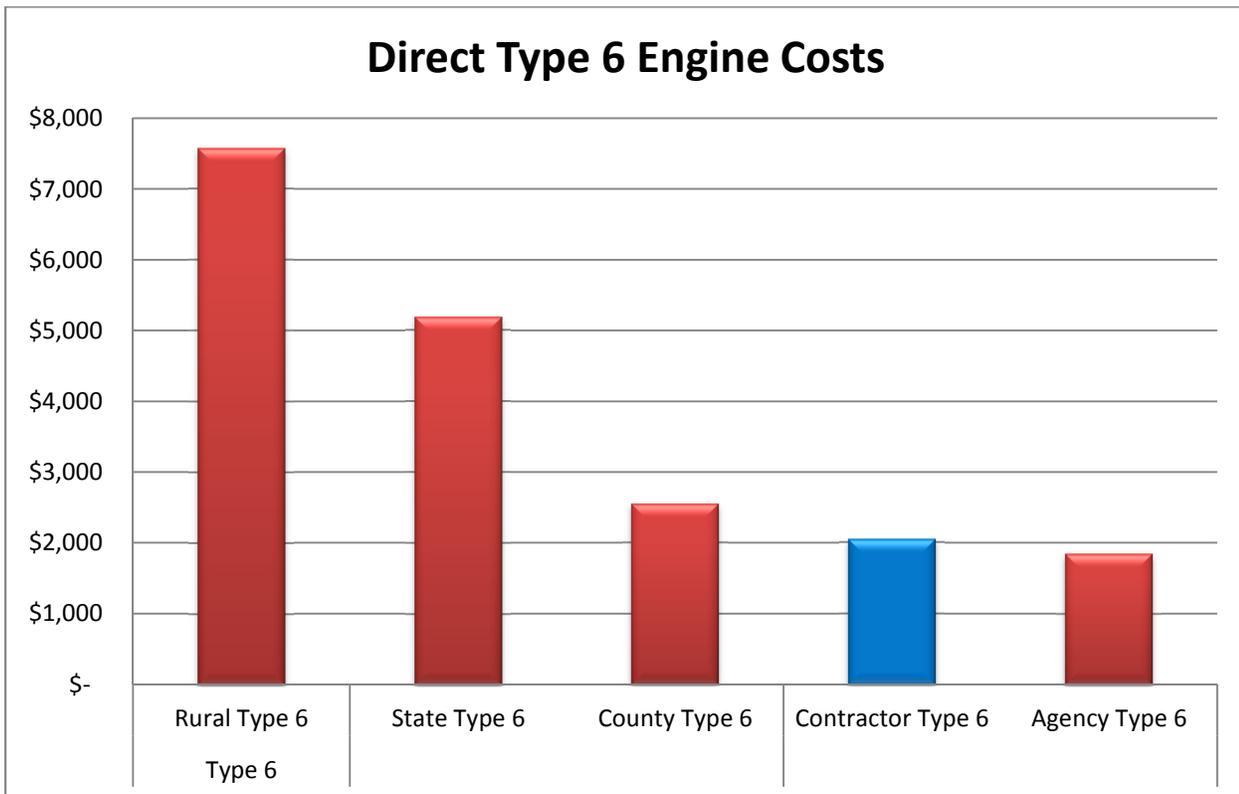


Figure 3: Agency and Contract Engine Direct Daily Cost Comparison

Summary Data For Direct Engine Costs:

Engine Type	Avg Direct Cost Per Day
Rural Fire Department Type 6	7,574
State Type 6	5,187
County Type 6	2,546
Contractor Type 6	2,051
Agency Type 6	1,848
Utah County Type 4	12,224
Contractor Type 4	2,172
Rural Fire Department Type 3	8,059
Agency Type 3	2,750

COMPARISON II

Cost Comparison Including Presuppression/Indirect Costs

1. Rationale for Inclusion of Presuppression/indirect Costs

- a. Maintaining an incident-ready resource entails expenditures, which average 30% of revenue for hand crew contractors and 34% of engine contractor revenue. Presuppression/indirect expenses include the purchase, maintenance, and repair of equipment and vehicles, personnel training, provision of administrative support and facilities, and the costs of licenses, permits, insurances, and benefits. Contract resource rates necessarily incorporate all of the contractor's costs of doing business. However, there are two additional taxpayer-borne costs of contract resources:
 - (i) ODF, through which the contract Type 2 hand crews are administered, charges an additional administrative fee of \$69.55 per crew, per day for use of those crews.⁷ These charges are billed to each using agency following the end of each fire season, and therefore are not reflected in I-Suite figures. The charge is applied in this comparison.
 - (ii) Contracts under which private sector Type 2IA crews operate carry an associated cost of contract administration. The current U.S. Department of the Interior, National Park Service fire crew contract solicitation estimates the cost of contract administration to be \$500.00 annually.⁸ For the purposes of this analysis, this cost was assumed to be the same for every agency contracting Type 2IA hand crews. Increased use of a contract resource results in amortization of this cost, resulting in a favorable cost-to-benefit ratio as shown in Table 2.

Table 2: Amortized Type 2IA Hand Crew Contract Administration Cost

Annual Days of Use	Daily Contract Administration Cost
10	\$50.00
30	\$16.67
50	\$10.00
100	\$5.00

For purposes of this cost comparison report, a highest cost per day scenario for contracted Type 2 IA crews of \$50 per day was used.

- b. Agency resource costs to an incident include only wages (including hazard pay and any differentials), payroll taxes, and direct incidental expenses. Consequently, simply considering the incident-related cost of agency resource is not reflective of the full cost to the taxpayer for that resource.

2. Hand Crews Including Presuppression/Indirect Costs

a. Figure 3 incorporates presuppression/indirect costs into the average daily cost of agency hand crew resources. The administrative fee for crews is included as well.

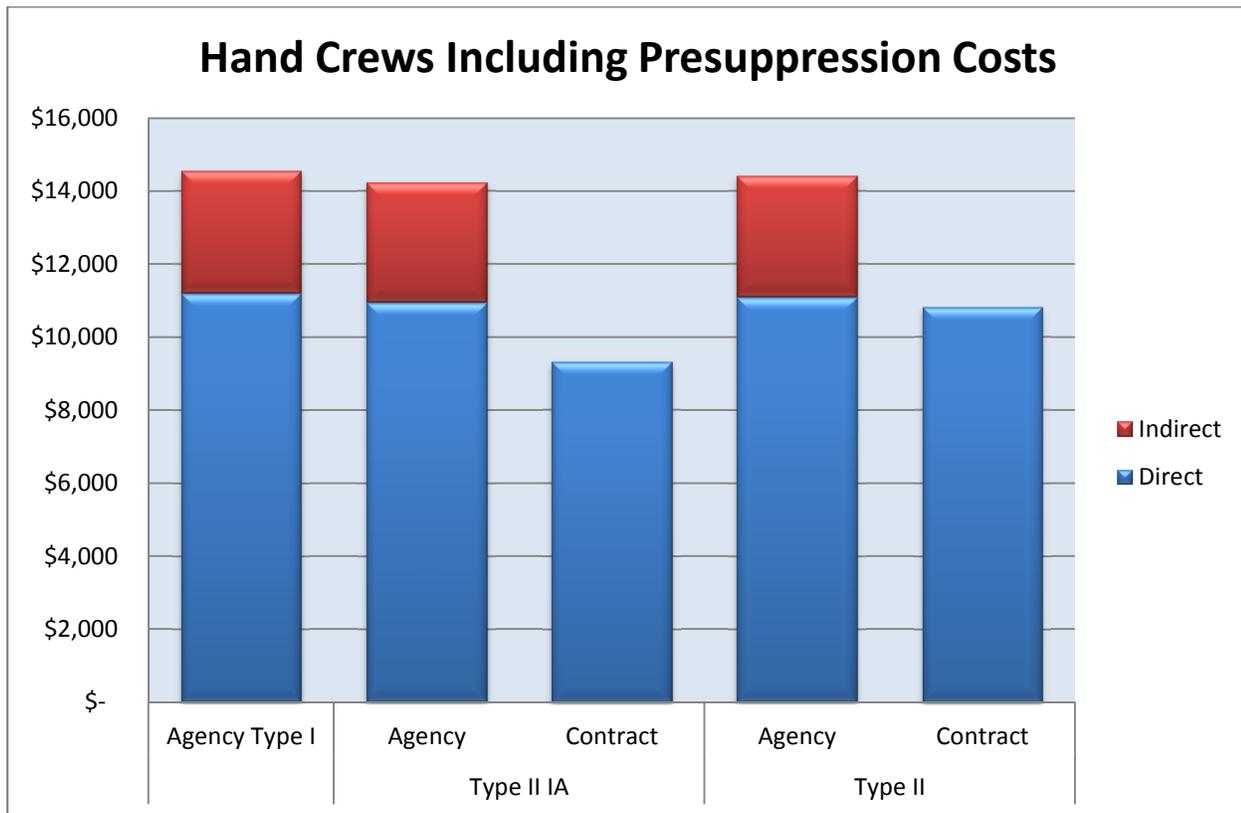


Figure 4: Hand Crew Cost Including Presuppression/Indirect Costs

Summary Data For Hand Crews Including Presuppression/Indirect Costs:

Crew Type	Avg Direct Cost Per Day	Indirect Cost Per Day	Total Cost Per Day
Agency Type 1	\$11,198	\$3,359	\$14,557
Agency Type II IA	\$10,947	\$3,284	\$14,231
Contract Type II IA	\$9,315	\$50	\$9,365
Agency Type II	\$11,091	\$3,327	\$14,418
Contractor Type II	\$10,815	\$70	\$10,885

3. Engines Including Presuppression/Indirect Costs

a. Figure 4 illustrates the average daily cost of agency engine resources once presuppression/indirect costs are included.

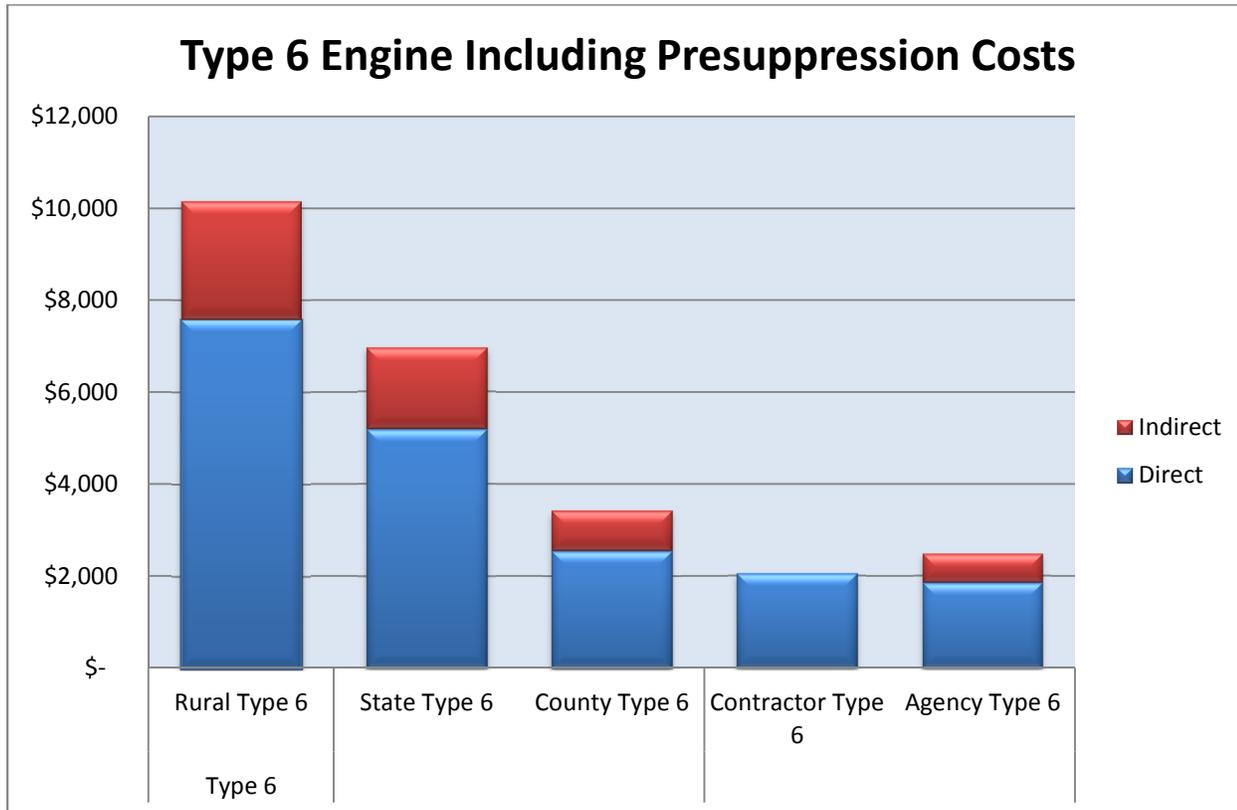


Figure 5: Type 6 Engine Cost Including Presuppression/indirect Costs

Summary Data For Engines Including Presuppression/Indirect Costs:

Engine Type	Avg Direct Cost Per Day	Indirect Cost Per Day	Total Cost Per Day
Rural Fire Type 6	\$7,574	\$2,575	\$10,149
State Type 6	\$5,187	\$1,764	\$6,951
County Type 6	\$2,546	\$866	\$3,412
Contractor Type 6	\$2,051	\$0	\$2,051
Agency Type 6	\$1,848	\$628	\$2,476
Utah County Type 4	\$12,224	\$4,156	\$16,380
Contractor Type 4	\$2,172	\$0	\$2,172
Rural Fire Type 3	\$8,059	\$2,740	\$10,799
Agency Type 3	\$2,750	\$935	\$3,685

SUMMARY

There are several caveats which must be taken into account when interpreting the information provided in this report. The first is that while presuppression/indirect costs have been applied to agency resources in this analysis, there remain additional hidden incident costs incurred by those resources. Incident-use fuel for vehicles and equipment, repairs of vehicle damages sustained during the assignment, and replacements for items damaged during the course of the assignment such as personal protective equipment, tires, tools, chain saws, and hose are all provided to agency resources, charged to the incident, and thereby paid for by the taxpayer. Contract resources are afforded no such privilege, paying for the fuel obtained throughout an assignment and replacing or repairing their equipment and supplies out of their own pockets.

Secondly, agency cooperators carry additional costs of their use not reflected in their daily rates. These costs typically include backfill and administrative charges specified in their mutual aid fire protection agreements with the agencies. These hidden charges can be substantial. Consider, for example, the cost in 2010 for the municipal Lake Tahoe Type 2IA hand crew.⁹ The charge per person, per hour was \$38.51, for a total of \$9242.00 over a twelve-hour shift. However, the backfill rate was \$57.76 per person, per hour and a 10% administrative fee, for a total of \$105.89 per hour per person, 275% higher than the base rate, which would have been reflected as the crew's cost in I-Suite. Use of this crew cost the taxpayer \$25,414.00 *for a twelve-hour shift*. In addition, some cooperator agreements dictate hotel accommodations rather than sleeping in an incident base camp for their personnel. None of these additional charges are included in the direct daily cost of a resource as recorded in I-Suite. Furthermore, some cooperators are paid portal-to-portal, which means they are paid for off-shift time as well as for active work time. Conversely, the hourly rate paid for a contract resource is that resource's only contributing factor to incident cost.

Finally, federal resources receive annual taxpayer funding. The Department of Interior's funding for Type 1 hand crews is \$608,000.00 per crew for the 2013 fiscal year.¹⁰ Budget information for Forest Service Type 1 hand crews was not available, but it is reasonable to assume that funding is similar for the Forest Service crews. There are 17 Department of Interior and 67 Forest Service Type 1 hand crews equaling a total funding expenditure of \$51,072,000.00. Ostensibly, this funding covers the wages of that resource. During an incident assignment, however, those wages are paid by the incident. It appears that this modus operandi, combined with the aforementioned incident supply, replacement, and repair practices, is largely tantamount to double billing the taxpayer for these resources. Additionally, permanent and seasonal federal resources employed for the purposes of fire protection and suppression are paid whether or not they are engaged in productive work during non-suppression days. In contrast, contract resources are utilized on an as-needed basis and thus paid only when dispatched.

The current national Type 2IA hand crew carries a minimum order guarantee of \$80,000.00 annually for each contract line item,¹¹ for a total commitment of \$3,280,000.00 to the 41 contract crews under the current contract. It is important to note that this is *not* an additional stipend paid by the taxpayer above and beyond what is paid for the contractor's work; it merely guarantees the contractor a modicum of work. For 2013, this equates to between eight and ten days of work, based on current contract pricing¹² and twelve hour work days. Moreover, contractors are available 365 days a year, while federal hand crews are only available for 120 days annually, at a greater cost of \$47,792,000.00 in funding alone.

Comparison Findings

1. Direct Daily Cost Comparisons

a. Hand Crews

- (i) The greatest cost disparity among hand crews is between agency and contract Type 2IA crews. I-Suite data shows that the average cost of agency Type 2IA hand crews is greater than their contract counterparts by \$1,632 per day. Over the course of a standard fourteen-day assignment, an agency resource is \$22,848 more costly than a contract crew. Depending on the mix of agency and contract resources, the total incident cost for Type 2IA hand crews could be significantly affected.
- (ii) Contract Type 2 hand crews are, on average, \$276 less costly per day than agency Type 2 hand crews. Over the course of a typical fourteen-day assignment, use of an agency Type 2 crew will accrue an additional cost to the incident of \$3,864 over the cost of a contract Type 2 hand crew.

b. Engines

- (i) By far, the greatest cost difference is between County cooperator and contract Type 4 engines. The average daily cost of a County cooperator Type 4 engine is \$10,052 more expensive than that of a contract Type 4 engine. Use of a County cooperator Type 4 engine boosts incident costs \$140,728.00 higher than the cost of a contract Type 4 engine for a standard fourteen-day assignment.
- (ii) Contract Type 6 engines cost an average of \$5,523 less per day than Rural cooperator fire department Type 6 engines. Cost to the incident for a standard fourteen-day assignment is \$77,322 more for a Rural cooperator fire department engine than for a contract resource.

2. Cost Comparisons with Inclusion of Presuppression/Indirect Costs

- a. It is important to remember that the direct daily cost of a resource as tallied in I-Suite affects only *incident* expenditure totals. The inclusion of presuppression/indirect cost factors provides a more accurate (though still incomplete) view of an agency resource's actual cost to the taxpayer.

b. Hand Crews

- (i) Once presuppression/indirect factors are taken into account, the cost of an agency Type 2IA hand crew is \$4,866 more per day than the average contract Type 2 IA hand crew rate, for a greater taxpayer burden of \$68,124 over a standard fourteen-day assignment.
- (ii) When the average daily costs of agency and contract Type 2 hand crews are adjusted to include presuppression/indirect costs and the ODF administrative fee, respectively, an agency crew costs \$3,533 more per day than a contract crew, and \$49,462 more per typical fourteen-day assignment.

c. Engines

- (i) Taking into consideration presuppression/indirect costs, County cooperator Type 4 engines average an additional \$14,208.00 per day more than the average daily rate of contract Type 4 engines. Over the course of a standard fourteen-day assignment, a County cooperator engine's cost is \$198,912.00 higher than that of a contract Type 4 engine.
- (ii) With the inclusion of presuppression/indirect factors, agency Type 6 engines are an average of \$425 more expensive than the average daily rate for a contract Type 6 engine. The cost of a fourteen-day assignment is \$5,950 greater for an agency engine than for a contract resource. A rural cooperator Type 6 engine costs an average of \$10,149 per day, \$8,098 more per day than that of a contract Type 6 engine. The cost of a fourteen-day assignment is \$113,372 greater for a rural cooperator fire department type 6 engine than that for a contract type 6 engine.

CONCLUSION

That the agencies bearing responsibility for wildland fire protection must maintain the readiness and capacity necessary for the protection of life, property, and the environment is indisputable. The need for realistic discourse regarding the most effective methods of achieving optimum capability through the most efficient mix of resources, however, has been long neglected. This discourse should include an in depth look at not only the costs associated with each type of resource, but also the dispatch protocols in place to ensure the cost effective use of all resources. The National Wildfire Suppression Association echoes the 2010 USDA OIG directive in requesting prompt additional efforts to accurately quantify all cost elements associated with every resource category utilized during wildfire suppression incidents. Effective application of the resulting information will allow more efficient management of available resources for successful achievement of incident objectives and optimal taxpayer benefit.

APPENDIX A

Table 3: Presuppression/Indirect Costs Expressed as a Percentage of Hand Crew Contractor Revenue

Budget Item	Contractor					Totals	Average
NR=cost not reported separately	1	2	3	4	5		
<u>Pre Suppression</u>							
Crew Vehicles	3%	3%	8%	5%	3.9%	23%	5%
Equipment	1%	5%	2%	4%	NR	12%	2%
PPE	3%	4%	2.25%	4%	0.1%	13%	3%
Radios	1%	1%	1%	2%	NR	5%	1%
Training	1%	5%	2%	3%	0.7%	12%	2%
Permanent Staff Support	0%	5%	1.5%	3%	7.8%	17%	3%
Health Insurance	0%	1%	1.5%	1%	0.9%	4%	1%
Auto Insurance	8%	5%	1.05%	2%	1%	17%	3%
Life Insurance	0%	1%	0%	0%	0%	1%	0%
Liability Insurance	6%	5%	1.1%	2%	0.5%	15%	3%
Errors & Omissions	0%	2%	0%	1%	0.1%	3%	1%
Licenses and Permits	0%	1%	1%	1%	0%	3%	1%
Indirect (Admin, Business Costs, Facilities, IT, Accounting, ect.)	5%	5%	3.1%	3%	8.25%	24%	5%
Total percentage of revenue							30%

Table 4: Presuppression/Indirect Costs Expressed as a Percentage of Engine Contractor Revenue

Budget Item NR=cost not reported separately	Contractor							Totals	Average
	1	2	3	4	5	6	7		
Pre Suppression									
Engine including replacement expenses	12%	6%	8.75%	12%	NR	3%	6%	48%	7%
Crew Vehicles	0%	9%	0%	0%	0%	0%	2%	11%	2%
Equipment	1%	6%	5.25%	1%	NR	1%	4%	18%	3%
PPE	NR	5%	1.75%	NR	5%	1%	1%	14%	2%
Radios	1%	1%	1%	1%	5%	1%	0.9%	11%	2%
Training	1%	3%	2%	1%	10%	2%	0.5%	20%	3%
Permanent Staff Support	1%	2%	1.5%	1%	0%	2%	5%	13%	2%
Health Insurance	0%	1%	1.5%	0%	0%	0%	0%	3%	0%
Auto Insurance	6%	3%	1.05%	6%	10%	10%	0.5%	37%	5%
Life Insurance	0%	0%	0%	0%	0%	0%	0%	0%	0%
Liability Insurance	NR	2%	1.1%	NR	10%	10%	1.1%	24%	3%
Errors & Omissions	0%	1%	0%	0%	0%	0%	0%	1%	0%
Licenses and Permits	1%	0%	1%	1%	0%	0%	0.2%	3%	0%
Indirect (Admin, Business Costs, Facilities, IT, Accounting, ect.)	10%	NR	3.1%	10%	NR	4%	7.5%	35%	5%
Total Percentage of Revenue									34%

ENDNOTES

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