

SUPPLEMENTAL REPORT

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

OCTOBER 2014

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INTRODUCTION

In October of 2013, NWSA released a cost analysis report comparing costs of wildland fire crews and engines among the various entities that provide these resources. As a follow-up, NWSA is releasing this report prepared to include a larger sample size and an additional year of sample data with the purpose of testing the results and findings of the original cost analysis report.

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. One of the foci of incident expenditure investigations has been the cost of the various resource categories. The original cost analysis report gathered data from five fires and reported the average costs of each resource type. It included data representing 87 crews that worked 1,002 days.

DATA

Resources Assessed

Remaining consistent with the original cost analysis, hand crews and engines are the most plentiful resource and are 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
Gold Pan Complex	MT-BRF-013039	Montana	42,749	7/31/13-8/28/13
Thompson Ridge	NM-N6S-000230	New Mexico	22,927	6/1/13-6/19/13
Manastash Ridge	WA-OWF-000619	Washington	2,352	8/21/13-9/6/13
Douglas Complex	OR-73C-000005	Oregon	48,679	7/27/13-8/25/13
Rim Fire	CA-STF-002857	California	257,314	8/18/13-9/25/13
Beaver Creek	ID-TFD-000337	Idaho	35,302	8/6/13-8/30/13

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

The same methodology that was used in the original cost analysis is used in this supplemental cost analysis. 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. In the supplemental data collection, there were 181 crews meeting the criteria that worked 2,579 fire days. 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 costs that are not included in an agency resource’s direct daily rates.¹ 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-Supplemental Cost Data

1. Hand Crews-Supplementary Cost Data

- 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.

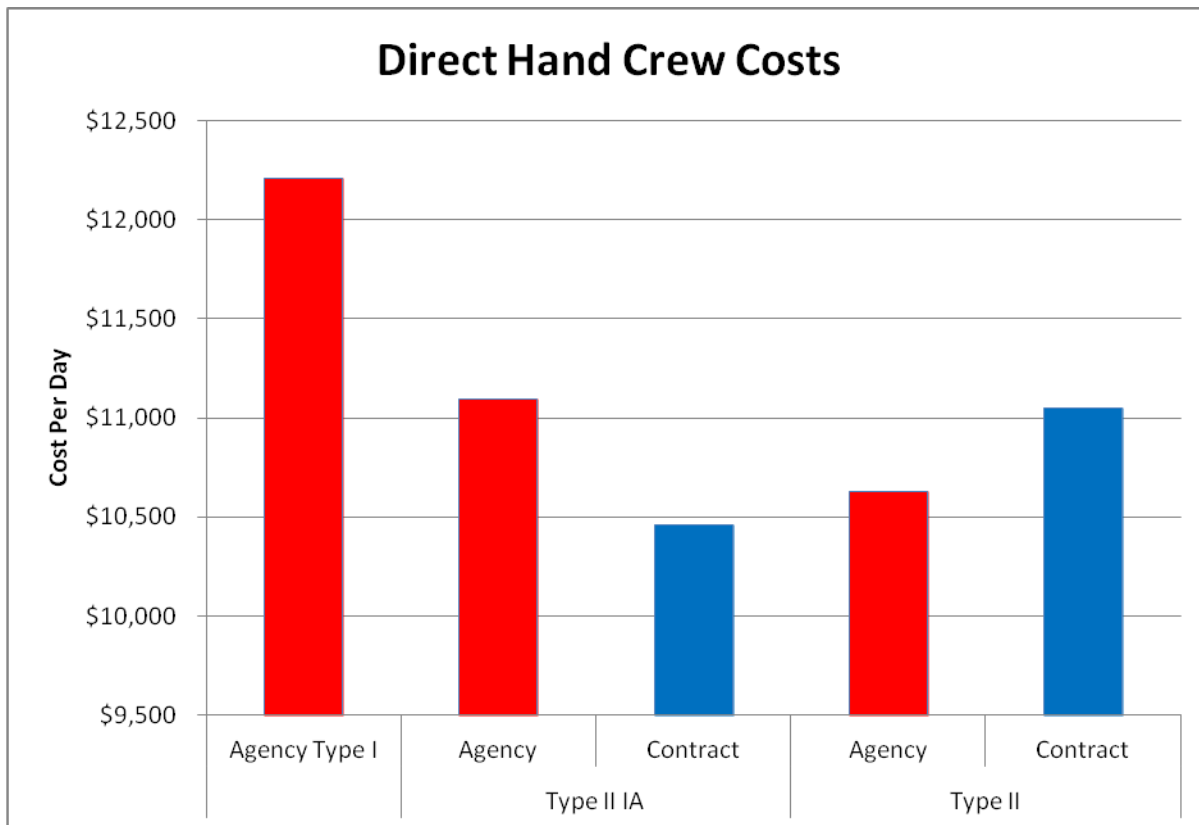


Figure 1: Agency and Contract Crew Direct Daily Cost Comparison-Supplemental Cost Data

Summary Supplemental Cost Data For Direct Hand Crew Costs:

Crew Type	Avg Direct Cost Per Day
Agency Type 1	\$12,208
Agency Type II IA	\$11,096
Contract Type II IA	\$10,461
Agency Type II	\$10,625
Contractor Type II	\$11,050

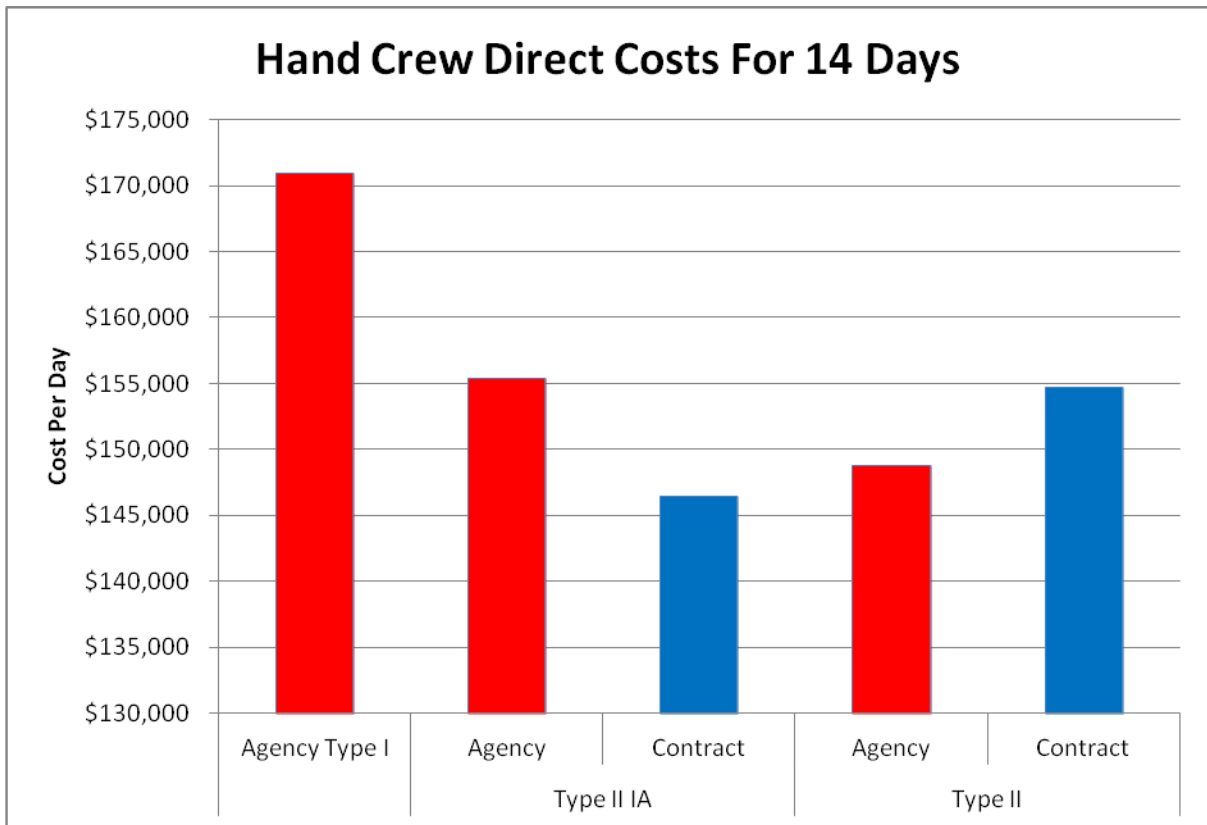


Figure 2: Agency and Contract Crew Direct 14 Day Cost Comparison-Supplemental Cost Data

Summary Supplemental Cost Data For Direct Hand Crew 14 Day Costs:

Crew Type	Avg Direct Cost Per 14 Days
Agency Type 1	\$170,912
Agency Type II IA	\$155,344
Contract Type II IA	\$146,454
Agency Type II	\$148,750
Contractor Type II	\$154,700

2. Engines

a. Figure 3 depicts the average direct cost per incident assignment day for a type 6 engine.

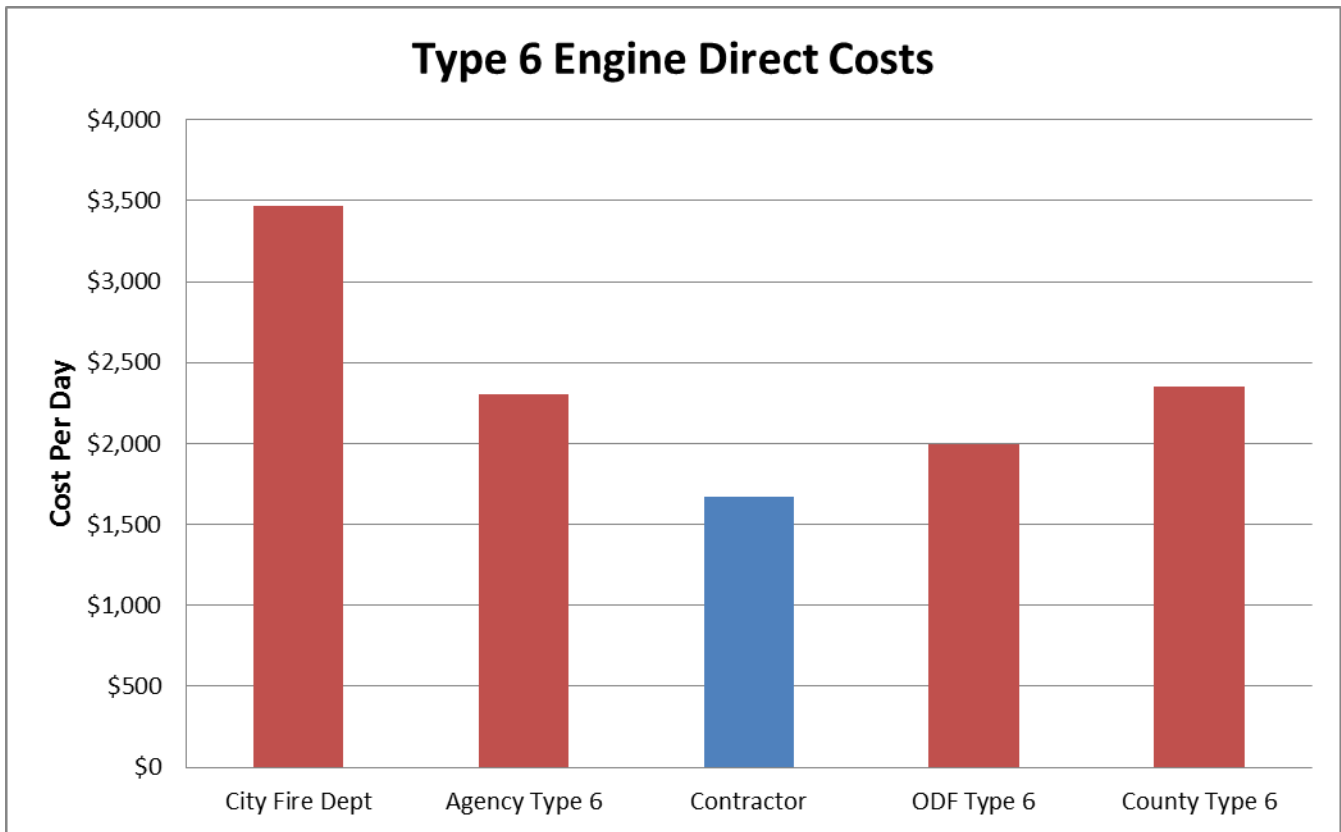


Figure 3: Agency and Contract Engine Direct Daily Cost Comparison-Supplemental Cost Data

Summary Supplemental Cost Data For Direct Engine Costs:

Engine Type	Avg Direct Cost Per Day
City Fire Department Type 6 Engine	3,464
Agency Type 6 Engine	2,305
Contractor Type 6 Engine	1,674
Oregon Dept. of Forestry Type 6 Engine	1,995
County Type 6 Engine	2,350
Agency Type 4 Engine	2,008
Contractor Type 4 Engine	1,940
City Fire Department Type 3 Engine	4,286
Agency Type 3 Engine	3,775
Contractor Type 3 Engine	2,127
Municipality Type 3 Engine	9,098

COMPARISON II

Cost Comparison Including Presuppression/Indirect Costs-Supplemental Cost Data

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.² 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.³ For the purposes of this analysis, this cost was assumed the same for every agency contracting Type 2IA hand crew. 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 4 incorporates presuppression/indirect costs into the average daily cost of agency hand crew resources. The administrative fee for crews is included as well.

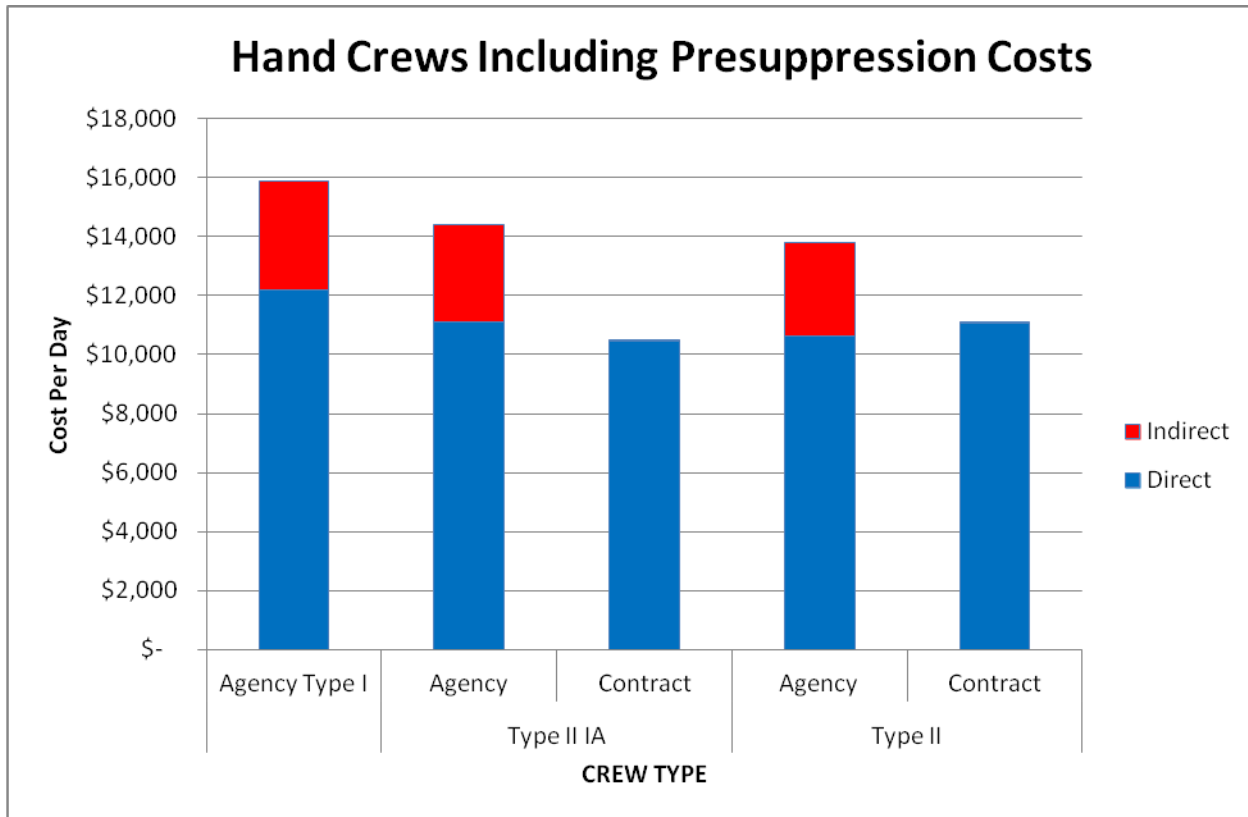


Figure 4: Hand Crew Cost Including Presuppression/Indirect Costs-Supplemental Cost Data

Summary Supplemental Cost 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	\$12,208	\$3,662	\$15,870
Agency Type II IA	\$11,096	\$3,329	\$14,425
Contract Type II IA	\$10,461	\$50	\$10,511
Agency Type II	\$10,625	\$3,188	\$13,813
Contractor Type II	\$11,050	\$70	\$11,120

3. Engines Including Presuppression/Indirect Costs

a. Figure 5 illustrates the average daily cost of agency engine resources once presuppression/indirect costs are included.

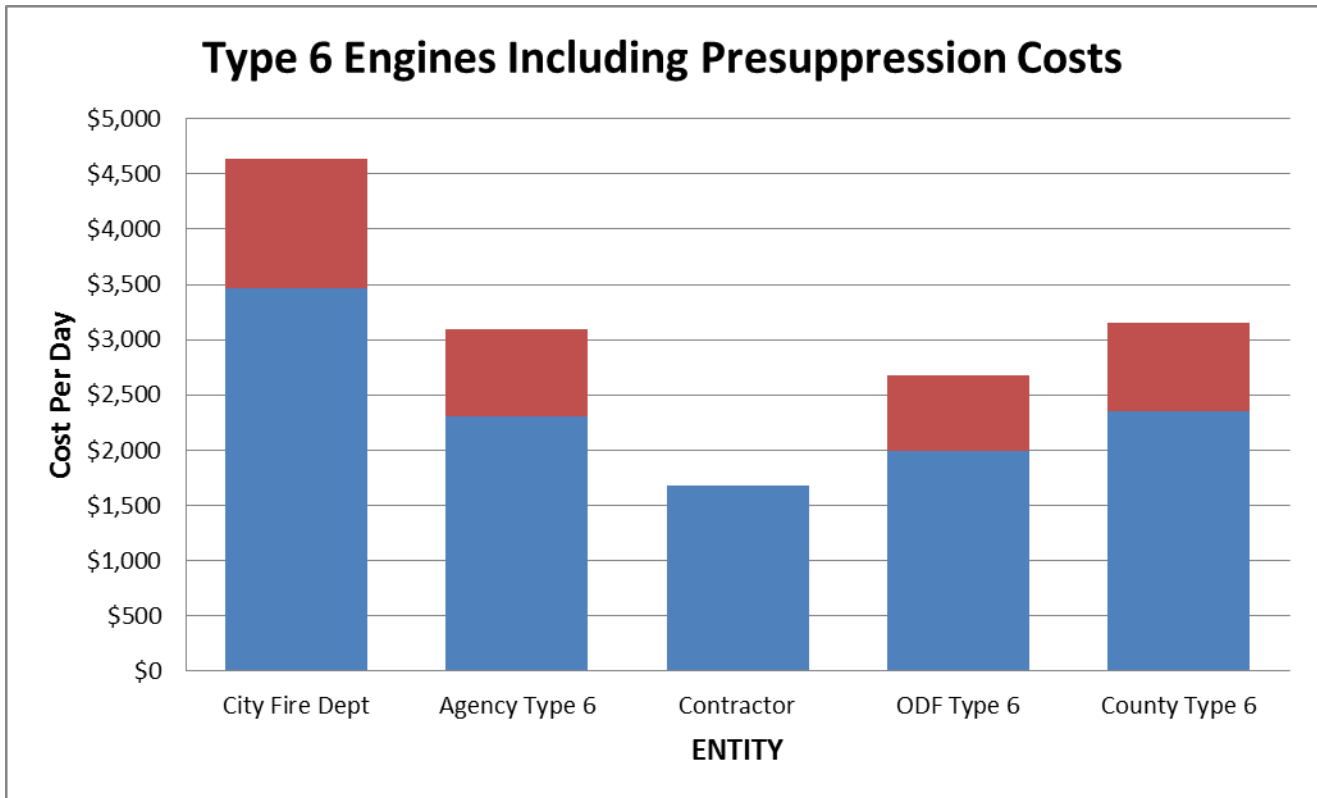


Figure 5: Type 6 Engine Cost Including Presuppression/indirect Costs-Supplemental Cost Data

Summary Supplemental Cost Data For Engines Including Presuppression/Indirect Costs:

Engine Type	Avg Direct Cost Per Day	Indirect Cost Per Day	Total Cost Per Day
City Fire Department Type 6 Engine	3,464	1,178	4,642
Agency Type 6 Engine	2,305	784	3,089
Contractor Type 6 Engine	1,674	0	1,674
Oregon Dept. of Forestry Type 6 Engine	1,995	678	2,673
County Type 6 Engine	2,350	799	3,149
Agency Type 4 Engine	2,008	683	2,691
Contractor Type 4 Engine	1,940	0	1,940
City Fire Department Type 3 Engine	4,286	1,457	5,743
Agency Type 3 Engine	3,775	1,284	5,059
Contractor Type 3 Engine	2,127	0	2,127
Municipality Type 3 Engine	9,098	3,093	12,191

COMBINED DATA-ORIGINAL COST ANALYSIS DATA PLUS SUPPLEMENTAL COST ANALYSIS DATA

Combining the data from the original cost analysis with the data from the supplemental cost analysis gives us a holistic look at the data collected. The data collected for hand crews represents 11 fire incidents in seven states spanning three years of time covering five separate United States Forest Service regions. The total sample size amounted to 266 hand crews working 3,581 crew days.

COMPARISON I

Direct Cost Comparison Compiled from I-Suite Data-Combined Cost Data

1. Hand Crews-Combined Cost Data

- a. Figure 6 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.

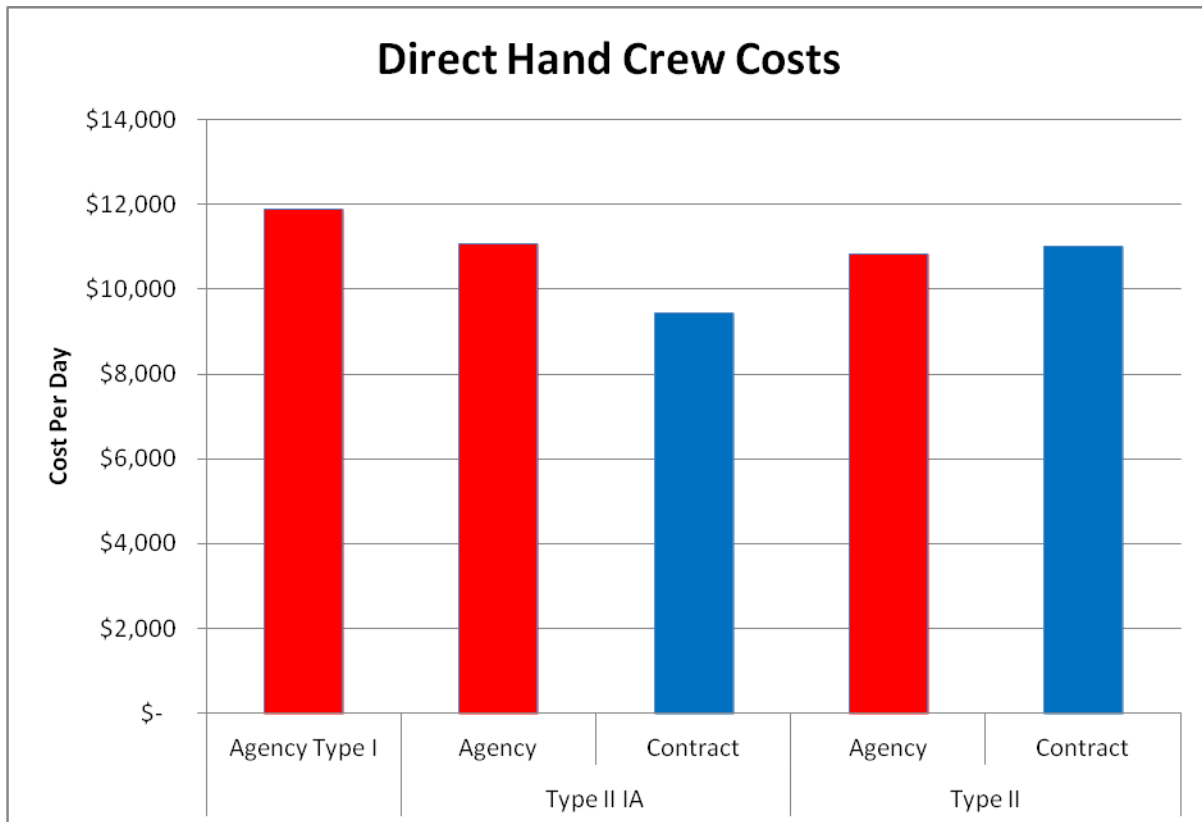


Figure 6: Agency and Contract Crew Direct Daily Cost Comparison-Combined Cost Data

Summary Combined Cost Data For Direct Hand Crew Costs:

Crew Type	Avg Direct Cost Per Day
Agency Type 1	\$11,901
Agency Type II IA	\$11,067
Contract Type II IA	\$9,445
Agency Type II	\$10,839
Contractor Type II	\$11,008

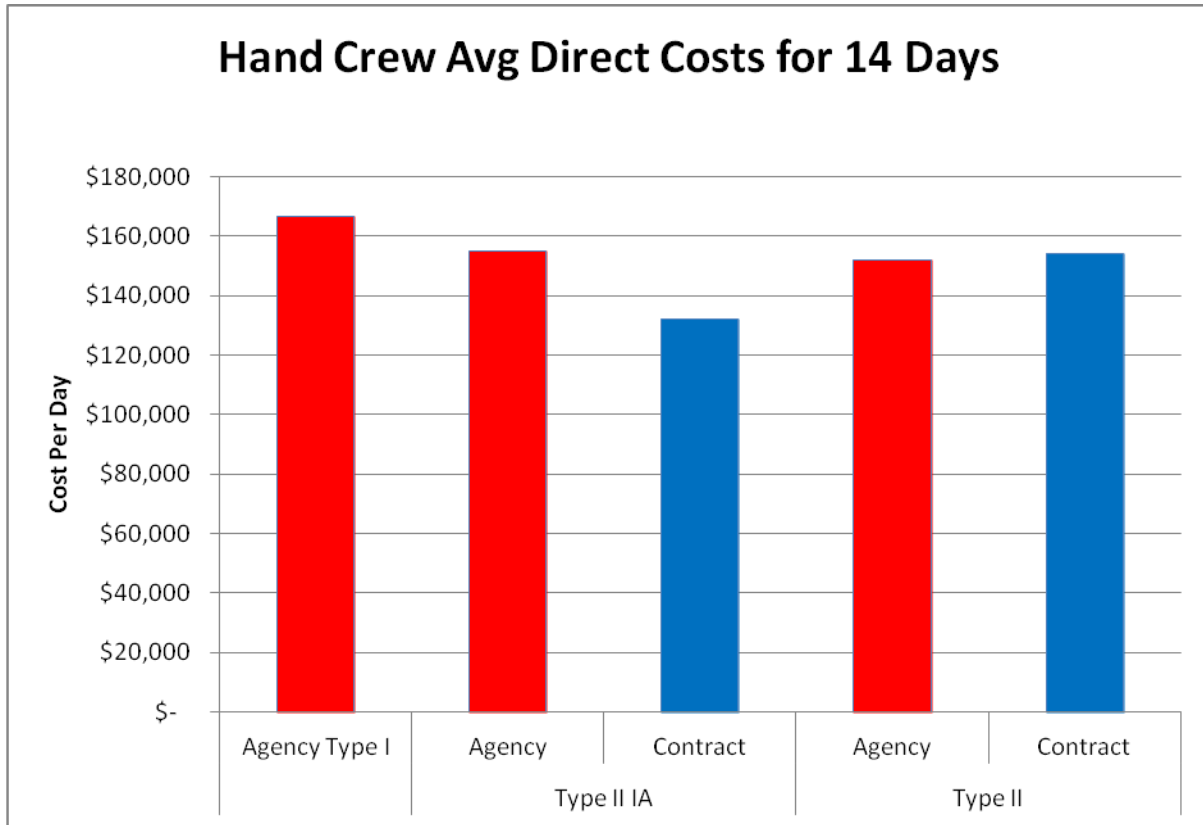


Figure 7: Agency and Contract Crew Direct 14 Day Cost Comparison-Combined Cost Data

Summary Combined Cost Data For Direct Hand Crew 14 Day Costs:

Crew Type	Avg Direct Cost Per 14 Days
Agency Type 1	\$166,614
Agency Type II IA	\$154,938
Contract Type II IA	\$132,230
Agency Type II	\$151,746
Contractor Type II	\$154,112

Cost Comparison Including Presuppression/Indirect Costs-Combined Cost Data

The same rationale was applied when taking the data from the original cost analysis report and combining it with the data from the supplemental analysis report.

2. Hand Crews Including Presuppression/Indirect Costs – Combined Cost Data

- a. Figure 8 incorporates presuppression/indirect costs into the average daily cost of agency hand crew resources. The administrative fee for crews is included as well.

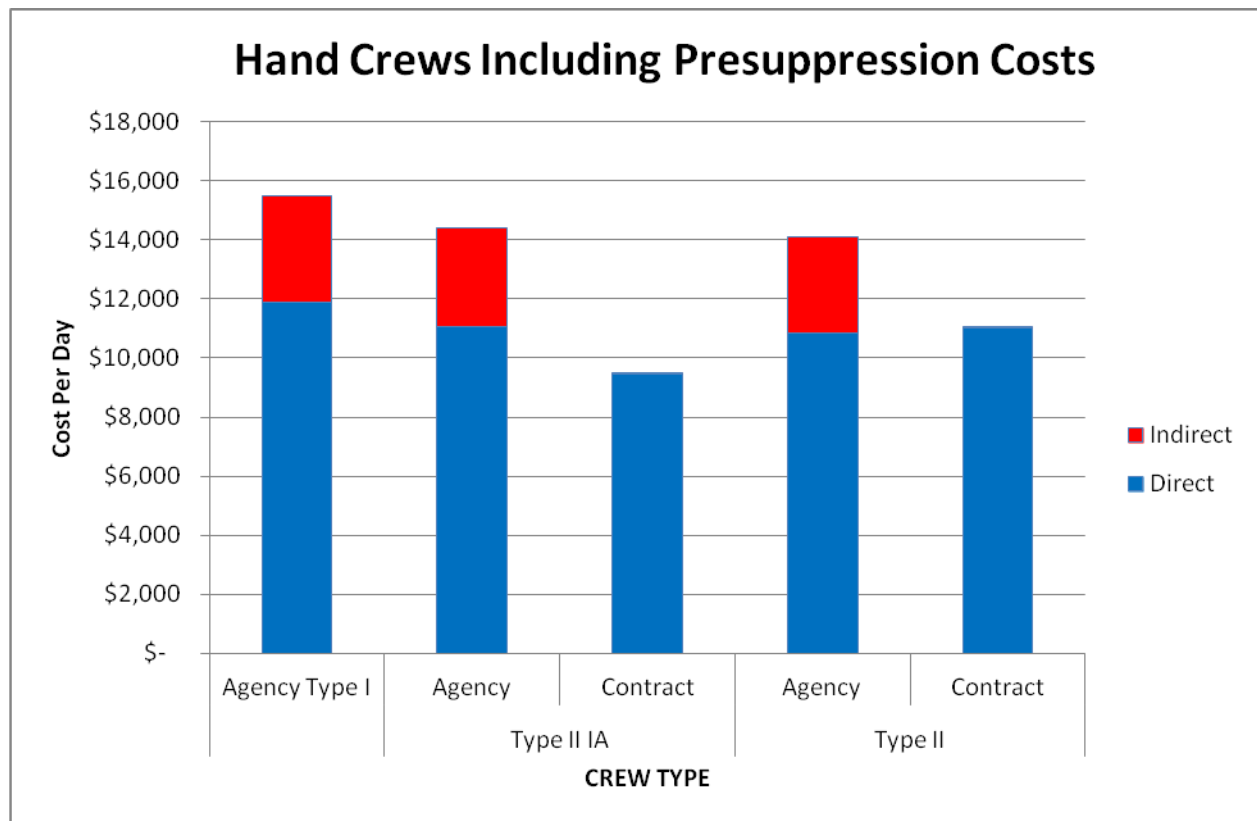


Figure 8: Hand Crew Cost Including Presuppression/Indirect Costs-Combined Cost Data

Summary Combined Cost 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	\$11,901	\$3,570	\$15,471
Agency Type II IA	\$11,067	\$3,320	\$14,387
Contract Type II IA	\$9,445	\$50	\$9,495
Agency Type II	\$10,839	\$3,252	\$14,091
Contractor Type II	\$11,008	\$70	\$11,078

SUMMARY

As stated in the original cost analysis report, 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. One of the largest hidden incident cost is the cost of workers compensation insurance. Additionally, 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 workers compensation insurance, 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. 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.⁴ 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 activity, 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 Ironwood Hotshots of Northwest Fire District near Tucson, AZ have recently been disbanded citing various financial and organizational hardships as the cause of separation. In an article by Bill Gabbert in *Wildfire Today*, it is reported that the Ironwood Hotshots responded to 118 fires and spent an average of 103 days per year on incidents between 2008 and 2014.⁶ The District Finance Director reported that Ironwood was reimbursed by the US Government at three times the actual hourly rate the district pays its firefighters in order to cover additional costs incurred while on wildland fire incidents. Operational expenses provided by Mr. Gephart illustrate that Ironwood Hotshots were reimbursed a total of \$7,200,000 between the fiscal years 2011 and 2013 for 309 crew days on incident, which equates to an average daily price of \$23,301, significantly higher than any other hand crew's average daily price in this cost report. The Ironwood Hotshots cost almost two and a half times the cost of a contract type 2 IA crew (245%) and one and a half times the cost of a federal agency type one crew (151%). It is difficult to understand why an organization comprised of public servants would feel justified in charging the US Government 245% more than what the US Government can outsource to the private sector and 151% more than what the US Government pays for its own hot shot crew.

The current national Type 2IA hand crew carries a minimum order guarantee of \$80,000.00 annually for each contract line item,⁵ 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 guarantees the availability of the contractor during a specific period of time and pays for the first eight to ten days of work, based on current contract

pricing⁷ 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.

The supplementary data gathered for the six additional fire incidents used in this report provide a larger overall sample size and a longer period of time from which the sample data was derived. While the average costs changed slightly from resource to resource, the data collected in this supplementary report support the findings stated in the original cost analysis report.

Comparison Findings

1. Direct Daily Cost Comparisons

a. Hand Crews (using Combined Cost Data)

- (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 \$1,622 (17% higher) per day. Over the course of a standard fourteen-day assignment, an agency resource is \$22,708 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, \$169 more (2% higher) costly per day than agency Type 2 hand crews. In the original cost analysis, agency type 2 crews were more costly, on average, than contract type 2 crews. Using direct costs only, type 2 crews provided by the agencies when compared to type 2 crews provided by contractors have a marginal savings in direct cost.

b. Engines (using Supplemental Cost Data)

- (i) The greatest cost disparity among engines is between a City Fire Department type 6 engine and a contract type 6 engine. Over the course of a standard fourteen-day assignment, a City Fire Department type 6 engine bears a greater cost than their contract counterparts by \$41,552.
- (ii) The second greatest cost disparity among engines is between a county fire department type 6 engine and a contract type 6 engine. Over a standard fourteen day assignment, a county fire department type 6 engine costs \$20,650 more than a contract type 6 engine.

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 (using Combined Cost Data)

- (i) Once presuppression/indirect factors are taken into account, the cost of an agency Type 2IA hand crew is \$4,892 more per day (52% higher) than the average contract Type 2 IA hand crew rate, for a greater taxpayer burden of \$68,488 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 \$3,013 more per day (27% higher) than a contract crew, and \$42,182 more per typical fourteen-day assignment.

c. Engines (using Supplemental Cost Data)

- (i) Once presuppression/indirect costs are taken into account, the cost disparities are materially larger between agency and cooperator type 6 engines in comparison to contract type 6 engines. Over the course of a standard fourteen day assignment, a City type 6 engine costs \$41,552 more than a contract type 6 engine. A County type 6 engine costs \$20,650 more than a contract type 6 engine.

Conclusion

The data collected in this supplementary cost analysis supports the findings and conclusion of the original cost analysis report. The combination of the data from the original report with the data from the supplemental report represents a much larger sample size spanning a longer period of time, resulting in a highly credible data sample.

Therefore, NWSA restates the conclusion of the original cost report. 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

1. The Congress of the United States, Congressional Budget Office, *Contractors' Support of U.S. Operations in Iraq*, 22.
2. Unpublished Oregon Department of Forestry data on file with the authors.
3. U.S. Department of the Interior, National Park Service, *PWR-Fire Fighting IDIQ*, 29.
4. U.S. Department of the Interior, *Budget Justification FY2013*, 15.
- 5 U.S. Department of Agriculture, Forest Service, *2013 National Type 2-IA Contract*, B-4.
6. Gabbert, B. (2014, October 6). *Ironwood Hotshots Disbanded*. Retrieved December 15, 2014, from Wildfire Today: <http://wildfiretoday.com/2014/10/06/ironwood-hotshots-disbanded/>
7. Ibid, 2013 pricing sheet.

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