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**IMPROVING AIR SUPPORT FOR WILDFIRE
MANAGEMENT IN THE UNITED STATES**

by

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September 2014

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**IMPROVING AIR SUPPORT FOR WILDFIRE MANAGEMENT IN THE
UNITED STATES**

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ABSTRACT

The use of aviation in wildfire management is essential to combating a growing hazard across the United States, but the modern organizational framework employed by the federal government is faulty. Chief among the problems is the contract-based approach; with rampant inefficiencies, unsafe practices, and stagnant culture that resists innovation, the contracted structure has wasted billions of dollars and cost firefighters their lives. This study looks at three options to take over the aviation wildfire responsibilities—the active duty military, the National Guard, and a new DHS agency—in terms of the legal, societal, fiscal, and organizational implications of each alternative. The active duty option would sacrifice traditional military readiness for a wildfire mission; the new DHS agency would require far too great an expense in political capital and funding to get started, in the absence of a focusing event. The National Guard option offers the most practical and acceptable solution for politicians and the public to provide an improved aviation service. With unique flexibility to operate under state or federal control, the National Guard would bring professional military capabilities to their existing role in wildfire management.

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TABLE OF CONTENTS

I.	INTRODUCTION.....	1
A.	MAJOR RESEARCH QUESTION.....	3
B.	IMPORTANCE.....	3
C.	PROBLEMS, ASSUMPTIONS, AND HYPOTHESES	4
D.	LITERATURE REVIEW	6
1.	An Active Duty Option	11
2.	National Guard Option.....	13
3.	A DHS Option	16
E.	METHODS AND SOURCES	18
F.	OVERVIEW.....	19
II.	EXISTING CONTRACTED APPROACH.....	21
A.	STATION FIRE	21
B.	CONTRACT-BASED SYSTEM	25
1.	Existing Wildfire Management Strategies.....	25
2.	Wildfire Aircraft	28
3.	Wildfire Dispatch	30
4.	Wildfire Contracts	31
C.	AIRCRAFT COSTS AND FUNDING	32
D.	EFFECTS OF THE CONTRACT-BASED APPROACH	34
1.	Maintenance and Safety	35
2.	A Stagnant Culture.....	36
3.	Innovation.....	37
E.	CONCLUSION	38
III.	ACTIVE DUTY MILITARY OPTION.....	41
A.	LEGAL/SOCIETAL/NATIONAL SECURITY ANALYSIS	41
1.	Advantages.....	44
2.	Disadvantages.....	47
B.	FINANCIAL ANALYSIS.....	50
1.	Advantages.....	50
2.	Disadvantages.....	53
C.	ORGANIZATIONAL ANALYSIS	54
1.	Advantages.....	55
2.	Disadvantages.....	57
D.	STATION FIRE	57
1.	Advantages.....	58
2.	Disadvantages.....	59
IV.	NATIONAL GUARD OPTION	61
A.	LEGAL/SOCIETAL ANALYSIS	61
1.	Advantages.....	61
2.	Disadvantages.....	65
B.	FINANCIAL ANALYSIS.....	66

1.	Advantages.....	66
2.	Disadvantages.....	69
C.	ORGANIZATIONAL ANALYSIS	70
1.	Advantages.....	70
2.	Disadvantages.....	71
D.	STATION FIRE	72
1.	Advantages.....	72
2.	Disadvantages.....	74
E.	CONCLUSION	75
V.	NEW DHS FIRE GUARD AGENCY OPTION	77
A.	LEGAL/SOCIETAL ANALYSIS	78
1.	Advantages.....	79
2.	Disadvantages.....	81
B.	FINANCIAL ANALYSIS.....	82
1.	Advantages.....	82
2.	Disadvantages.....	86
C.	ORGANIZATIONAL ANALYSIS	87
1.	Advantages.....	87
2.	Disadvantages.....	90
D.	STATION FIRE	90
E.	CONCLUSION	92
VI.	CONCLUSIONS AND RECOMMENDATIONS.....	93
A.	COMPARISON.....	93
B.	ANALYSIS	94
1.	Active Duty	95
2.	U.S. Fire Guard	96
3.	National Guard.....	97
C.	RECOMMENDATIONS.....	100
D.	ADDITIONAL STUDY	101
	LIST OF REFERENCES	103
	INITIAL DISTRIBUTION LIST	115

LIST OF TABLES

Table 1. MAFFS information provided from the U.S. Forest Service.....86
Table 2. Option comparison.....94

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LIST OF ACRONYMS AND ABBREVIATIONS

BLM	Bureau of Land Management
CAL FIRE	The California Department of Forestry and Fire Protection
CAP	Combat Air Patrol
CBP	Customs and Border Patrol
CWN	Call When Needed Contract
DHS	Department of Homeland Security
DOD	Department of Defense
EMAC	Emergency Management Assistance Compact
FS	Forest Service
GACC	Geographic Area Coordination Center
GAO	Government Accountability Office
NG	National Guard
NIFC	National Interagency Fire Center
NIMS	National Incident Management System
NORTHCOM	U.S. Northern Command
NRF	National Response Framework
NVD	Night Vision Device
SEAT	Single-Engine Airtanker
UAV	Unmanned Aerial Vehicle
USFG	United States Fire Guard

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I. INTRODUCTION

In 2009, the Station Fire in southern California burned 160,000 acres, killed two firefighters, endangered vital infrastructure, and threatened thousands of homes and millions of lives.¹ It nearly torched the NASA Jet Propulsion Laboratory and vital electrical infrastructure for all of Los Angeles County in the months that it burned. The Station Fire ranks “among the most costly fires in the nation’s history.”² The toll owes much to the way the blaze was—and was not—attacked, especially early in its development.

Experts question, among other things, “whether sufficient aviation assets were available to respond ... and whether the response was indicative of a broader need for more or different assets to respond.”³ Key here was the underuse (or unavailability) of suitable aircraft and crews, particularly for the rugged, inaccessible terrain over which the Station Fire raged. The fact was the fire authorities in the Station Fire had few options and less capacity to bring aircraft to bear in their effort because such assets are procured on a contract basis; no agency owns or operates sufficient or dedicated wildfire aviation assets. The experience of the Station Fire, among others, made clear that the existing contract-based system and its pervasive effects on wildfire aviation fail to satisfy modern requirements for air support in wildfire management.

The cross-jurisdictional relationships and the inequality of wildfire resources among the states further complicate the management of wildfires. California remains the only state with dedicated, government-owned and –operated fire suppression aircraft for use in State Parks and private lands. All other states depend entirely on ad-hoc combinations of the already over-tasked Forestry Service-contracted assets, the Bureau of Land Management-contracted resources, the National Guard, or individually state-

¹“Station Fire: Forest Service’s Response Offers Potential Lessons for Future Wildland Fire Management” (Washington, DC: GAO, December 2011), 1, accessed from <http://www.gao.gov/assets/590/587075.pdf>.

²“Station Fire,” 1.

³Ibid., 49.

contracted assets. National Guard units in high-threat states must split training and operational budgets to meet increased demands for assistance. The contract-based approach and its high cost, low availability resources have exacerbated jurisdictional rivalries and territorial divisions among federal agencies, states, and local communities.

The federal government, through the U.S. Department of Agriculture's Forest Service (FS) and the Department of the Interior's Bureau of Land Management (BLM), manages nearly the entire nationwide aviation aspect of wildfire management efforts. The FS employs airtankers that have rapid reactivity and large ranges to help keep small fires small.⁴ Aviation activities include vital support for the ground through direct attack on fires, smokejumper parachute teams, fire retardant application, resupply, air ambulance, and aerial ISR (intelligence, surveillance, and reconnaissance).⁵ The number of the essential large airtankers available to fight fires in the United States has dropped "from 44 in 2002 to 8 in early 2013."⁶

The government's wildfire management has often been criticized for its diminished resources, failed modernization programs, and inflexible structure.⁷ Nine studies since 1995, both independent and government-commissioned, highlight the urgent need for aviation reform and the lethargic response by FS and BLM. Critics charge that the current system inefficiently divides management and resource allocation across federal, state, local, and tribal jurisdictions, placing lives and infrastructure at risk. Blazes like the Station Fire bear out these criticisms.

⁴"National Study of Airtankers to Support Initial Attack and Large Fire Suppression: Phase 1" (USDA Forest Service, Department of Interior: 1995), x, accessed from http://www.fs.fed.us/fire/publications/aviation/nats1_report.pdf

⁵"Management Efficiency Assessment on Aviation Activities in the USDA Forest Service" (Management Analysis Incorporated, 2005), 3, accessed from http://www.fs.fed.us/fire/management/assessments/av_mgmt_efficiency_assessment_summary.pdf

⁶"Fire Improvements Needed," 1.

⁷"Wildland Fire Management: Improvements Needed in Information, Collaboration, and Planning to Enhance Federal Fire Aviation Program Success" (Washington, DC: GAO, August 2013), 36, accessed from http://www.iawfonline.org/2013_GAO_Air_Tanker_Study.pdf.

A. MAJOR RESEARCH QUESTION

According to many critics, aviation support for wildfire management in the United States lacks a coordinated structure across jurisdictions and maintains a vulnerable dependency on contracted assets.⁸ The escalating demand for air support requires a reevaluation of the current system and a fresh organizational framework that focuses assets, operators, and perishable corporate knowledge under federal auspices. A unified effort for fixed-wing, rotary-wing, and unmanned systems can better meet the challenges of modern and future wildfires.

Often, and increasingly today, the U.S. armed forces are called on to contribute—or provide entirely—the necessary air suppression, but fighting domestic wildfires represents a mission well outside the Department of Defense’s primary national security responsibilities. It also raises the specter of civil-military imbalances—whether or not *Posse Comitatus* forbids such activities. Thus, one part of that unified effort that needs to be reevaluated is the role of the U.S. military. The military operates many types of firefighting aircraft, but is generally limited to a supporting role in today’s wildfire management efforts. It may be time to change this model. The frameworks of the military services in active duty, the National Guard (NG), and the Coast Guard offer alternatives for direct absorption or reorganization of the entire wildfire aviation industry.

This thesis examines the question: What is the appropriate operational framework to provide better air support for wildfire management in the United States? In finding the best model, the research must answer the following additional questions: Why is the current system of air support failing to meet demands and by what metrics is it measured? What are the best models for wildfire aviation reorganization: the active duty military, the National Guard, or some new agency contained within DHS?

B. IMPORTANCE

Maintaining U.S. national security and protecting critical infrastructure, property, and lives require capable and efficient air support to manage the growing wildfire threat

⁸“Fire Improvements Needed,” 11; “Firefighting Aircraft Study,” 70–71.

in the United States. Wildfires present significant hazards in much of the United States, creating major financial effects through destruction of property, costing lives, and incurring high management costs. Wildfires are not just a local problem, but are a national security issue, particularly with respect to infrastructure. The Government Accountability Office (GAO) reported that “since 2000, numerous fires have each cost more than \$75 million to suppress” and caused hundreds of millions of dollars of damage.⁹ A RAND study found that “every year between 2000 and 2010 saw more than \$1 billion in federal suppression expenditures, including 2002 and 2006, when expenditures exceeded \$2 billion.”¹⁰ Air suppression assets remain a vital fixture of initial attack strategies on small, growing fires and suppression of large wildfires.

C. PROBLEMS, ASSUMPTIONS, AND HYPOTHESES

This thesis argues that, beyond additional assets, the U.S. wildfire suppression system requires a new model, built around sustainable firefighting forces and organizational adaptability, in order to meet the increasing demands placed on it today. Wildfire management require continuous operations of aircraft to gain full control of fires and halt their spread. Lacking standardization, contracted forces consisting of rare and dissimilar aircraft significantly increase maintenance costs and unavailability to the mission, as parochial maintenance crews lack interoperability and mutual support.

In her book *Spying Blind*, Amy Zegart writes that “organization matters... structures create capabilities and jurisdictions, determining who performs what task by what authority at what level of competency.”¹¹ The problems facing our current method for fighting wildfires are largely organizational. An overreliance on contracted services restricts firefighting organizations from adapting with the changes in their mission. Because contracted units lack any incentive to innovate and must consider costs of

⁹“Station Fire,” 4.

¹⁰Edward G. Keating, Andrew R. Morral, Carter C. Price, Dulani Woods, Daniel M. Norton, Christina Panis, Evan Saltzman, Ricardo Sanchez, “Air Attack Against Wildfires: Understanding U.S. Forest Service Requirements for Large Aircraft” (Arlington, VA: RAND, 2012), 14, accessed from http://www.rand.org/content/dam/rand/pubs/monographs/2012/RAND_MG1234.pdf.

¹¹Amy B. Zegart, *Spying Blind: The CIA, the FBI, And the Origins of 9/11* (Princeton: Princeton University Press, 2007), 196.

service improvements against financial benefits, the only change typically considered is to expand existing services—an expensive and inefficient solution to a growing problem.

It is possible, however, to design a more effective and efficient system. Wildfire management efforts, like other government services, can be examined through a cost-benefit analysis that considers the overall costs to the public and economy that are incurred, and weighs those costs against the need for safe and efficient mission completion. Altering the incentives away from dependency on contracted assets can encourage innovative methods to minimize the shared public costs of wildfires. Instead of inefficient contract costs to the Forest Service and Bureau of Land Management, publicly owned and operated aviation assets can maintain relatively fixed costs; this may spur investments for innovations like UAVs and night flying.

The analysis of this thesis develops from several assumptions. The first assumption is that climate change follows the existing standard models and will spread extreme fire conditions beyond the traditional Western United States. Conventional models hold that increased temperatures, droughts, and other intense weather shifts will place the rest of the United States in extreme risk for wildfires. Scientific studies conclude that the entire U.S. wildfire risk will increase over the next half century due to climate change. The National Climate Assessment and Development Advisory Committee (NCADAC) cites significant evidence that climate changing tendencies exist and will continue.¹² The NCADAC writes that the “U.S. average temperature has increased 1.5°F since 1895,” and forecasts “another 2°F to 4°F” in the next 30 to 50 years.¹³ Amid such heat and the likely drought to attend it, the Western United States “will be increasingly affected by large and intense fire that occur more frequently,” and

¹²“National Climate Assessment and Development Advisory Committee Report: Introduction - Letter to the American People” (Washington, DC: National Climate Assessment and Development Advisory Committee 2013), 1, accessed from <http://ncadac.globalchange.gov/download/NCAJan11-2013-publicreviewdraft-letter.pdf>.

¹³“National Climate Assessment and Development Advisory Committee Report: Introduction—Executive Summary” (Washington, DC: National Climate Assessment and Development Advisory Committee 2013), 3, accessed from <http://ncadac.globalchange.gov/download/NCAJan11-2013-publicreviewdraft-chap1-execsum.pdf>.

the East may experience “rising temperature combined [sic] with seasonal dry periods, more protracted drought and/or insect outbreaks to trigger wildfires.”¹⁴

The second assumption is that the current system is insufficient to meet contemporary demands for aviation support to wildfire suppression. In turn, the existing system remains incapable of meeting greater demands from a more expanded regional threat.¹⁵

The present research hypothesizes that the cultural resistance to change and innovations within the FS and BLM requires the transfer of aviation responsibilities to programs that maintain higher levels of transparency and accountability, and which can bring new technologies to bear on the problem. Greater accountability for proven results incentivizes technological advancements and operational improvements. The continued development and incorporation of new assets, like UAVs, compels wildfire aviation to adapt coherent strategies to interoperate in a congested airspace. These new aviation wildfire responders could come from the active duty military forces, the National Guard, or some new agency within DHS, and this thesis proposes to compare these three possible solutions.

D. LITERATURE REVIEW

A paucity of information and scholarly study exists in the realm of aerial suppression of wildfires. In an effort to correct deficiencies and justify larger budget requests, the Department of Agriculture’s Forestry Service and the Department of the

¹⁴National Climate Assessment and Development Advisory Committee Report: Forestry” (Washington, DC: National Climate Assessment and Development Advisory Committee 2013), 266, accessed from <http://ncadac.globalchange.gov/download/NCAJan11–2013-publicreviewdraft-chap7-forestry.pdf>.

¹⁵“Fire Improvements Needed,” 12.

Interior's Bureau of Land Management commissioned nine studies since 1995 focusing on aviation in wildfire management.¹⁶

In a 2013 Congressional Research Service publication, Kelsi Bracmort discusses the current federal function and commitment to wildfire management. The report illustrates the roles FS and BLM in contemporary wildfire suppression. The costs of wildfire suppression increased steadily over the past several decades, with “more than \$2.7 billion ... appropriated for WFM in FY2012.”¹⁷ The long-term outlook tends to see an increase federal suppression costs, the numbers and sizes of wildfires, and the effects on effected communities. The federal response, through the FS and BLM, coordinates with the individual state and local resources depending on the jurisdictional make up of the effected lands. The FS holds responsibilities for “national forests and grasslands fires”; DOI handles “national parks, wildlife refuges and preserves, Indian reservations, and on public lands.”¹⁸

Fatal mishaps in 2002 and two more in 2012 have prompted calls for better program management. In 2002, two separate incidents occurred where older contracted airtankers experienced wing separation from the aircraft in flight killing all aboard. The year 2012 saw one National Guard C-130 aircraft crash into the ground just days after

¹⁶“Airtankers Phase 1”; “National Study of (Large) Airtankers to Support Initial Attack and Large Fire Suppression: Phase 2” (USDA Forest Service, Department of Interior: November 1996), accessed from http://www.fs.fed.us/fire/publications/aviation/nats_final_phase_2.pdf; “National Study of Tactical Aerial Resource Management to Support Initial Attack and Large Fire Suppression” (USDA Forest Service, Department of Interior Bureau of Land Management: October 1998), accessed from <http://www.fs.fed.us/fire/publications/aviation/tarms.pdf>; “Wildland Fire Management Aerial Application Study” (Sandy Oregon: Fire Program Solutions LLC, 17 October 2005), accessed from http://www.fs.fed.us/fire/publications/aviation/nats3_wfmaas_report_final.pdf; “Management Efficiency Assessment on Aviation Activities in the USDA Forest Service” (Management Analysis Incorporated, 2005) accessed from http://www.fs.fed.us/fire/management/assessments/av_mgmt_efficiency_assessment_summary.pdf; “National Interagency Aviation Council: Interagency Aviation Strategy” (National Interagency Aviation Council, 24 August 2009), accessed from http://www.fs.fed.us/aboutus/budget/requests/6244655_FSNIAC_Strategy_Final.pdf; “Large Airtanker Modernization Strategy” (USDA Forest Service, 10 February 2012), accessed from http://www.fs.fed.us/fire/aviation/airtanker_modernization_strategy.pdf; “Air Attack Wildfires,” “Firefighting Aircraft Study.”

¹⁷Kelsi Bracmort, “Wildfire Management Federal Funding and Related Statistics,” (Washington, DC: CRS, 30 August 2013) 1, accessed from <https://www.fas.org/sgp/crs/misc/R43077.pdf>.

¹⁸ Bracmort, “Wildfire Federal Funding,” 5.

being activated to support wildfire efforts.¹⁹ Finally, in May of 2012, FS began to collect information for the effectiveness of large airtankers, but FS has failed to gather metrics on helicopters and single engine tankers.²⁰ FS collection efforts encountered resistance from industry operators based on fears of safety with over tasking of crews on missions, resistance from the industry culture against changes, and concerns over the retributive use of the information.²¹

Several reviews called for better information collection and performance metrics of aviation suppression of wildfires. The AVID study wrote that the need for information comes from the Forestry Service policies of containing wildfires in the initial attack through extensive use of tankers.²² Beyond cost alone, the report accounted for “the effects of ground crew, aircrews, support systems, weather models, and other factors.”²³ The GAO repeatedly called for the “collection of information on the performance of firefighting aircraft,” to include successful drops, effects of the drops on the fire, and on what terrain the drop took place.²⁴ Without performance matrixes, the success of the policies remains an unproven assumption, and “there is not enough data” to find the crucial measurement of efficiency.²⁵ To conduct their models and studies, AVID and RAND had to extrapolate and assume information from simple flight time logs. Currently, no standards exist to empirically measure the effectiveness of aviation assets on wildfire, but AVID created its study from the number of unfulfilled orders against the number of orders placed.²⁶

¹⁹“Fire Improvements Needed,” 27.

²⁰“ Fire Improvements Needed,” 15.

²¹“Fire Improvements Needed,” 16. In British Columbia, Canadian wildfire pilots complete after action reports after flights, and the data collected has helped adjust firebase locations for more expeditious responses. Working for the Minnesota Department of Natural Resources, firefighting aircrews complete similar reports that include mission specifics and program improvements.

²²“ Firefighting Aircraft,” 14.

²³“Firefighting Aircraft,” 16.

²⁴“ Fire Improvements Needed,” 15.

²⁵“Firefighting Aircraft,” 14–16.

²⁶“ Firefighting Aircraft,” 19.

The percentage of filled and unfilled orders provides a glimpse into the fleet size, but fails to quantify their effects on the wildfire management. With increased numbers of aircraft having the biggest effect, the study concluded that the percentage of unfulfilled orders reached “a point of diminishing return beyond about 40 or 50 airtankers,” at average historic demands.²⁷ Aerial firefighters are reluctant to perform post flight effectiveness surveys due to concerns from their potential usage by the Forest Service to critique the contractors. The GAO wrote that a “firefighting culture that values experience and history over data and scientific analysis,” hurts academic study of the programs.²⁸

In prepared testimony before the U.S. Senate Committee on Energy and Natural Resources, the Managing Director of Natural Resources and Environment, Patricia Dalton, delivered a wildland fire management report critiquing the current system of fire suppression effectiveness and budget restraint. Dalton described that the system fails to share budgetary burdens with state and local governments when encountering multijurisdictional wildfires. Without prior agreements, the “federal agencies typically fund the costs of these activities from their wildland fire suppression accounts.”²⁹ The financial responsibilities, usually incurred by the federal government, reflect the lack of a cohesive strategy and tactical leadership to achieve the “overarching goal of suppressing wildland fires at minimum cost.”³⁰

Dalton misses the necessary requirements of wildfire suppression by assuming cost overages derive from an unnecessary dependence on expensive resources. Relying on presumed inexpensive ground assets alone, protracted engagements to suppress wildfires unnecessarily risks lives and expansion of wildfires. Countering Dalton’s focus

²⁷“Firefighting Aircraft,” 71; “Firefighting Aircraft,” 64.

²⁸“Fire Improvements Needed,” 16.

²⁹“Wildland Fire Management: Federal Agencies Have Taken Important Steps Forward, but Additional Action is Needed to Address Remaining Challenges,” (Washington, DC: GAO, 21 July 2009) 3, accessed from <http://www.gao.gov/assets/130/123076.pdf>.

³⁰“Fire Important Steps,” 12.

on the immediate budget, wildfire strategies that employ aviation resources can “reduce unnecessary risks to firefighters” and long-term costs to the community and the nation.³¹

Many experts use the Station Fire in late summer of 2009 to highlight key vulnerabilities within the existing framework. Some critics hold that the fire escaped initial containment efforts due to the short supply of air assets. A GAO report in 2012 discussed the shortcomings of the response.³² Hampered by rough terrain and high fire conditions, the Station Fire effort employed massive federal, state, local, and contract assets, with more than 5200 firefighters working the blaze at one point or another.

Some observers claim the mishandled response to the Station Fire is indicative of the lack of accountability within the Forest Service.³³ They claim the FS aversion to night flying wasted valuable time to control the fire and permitted the spread. The GAO wrote the FS hold that “the risks of flying at night outweigh the benefits.”³⁴ Whether due to crew experience, aircraft compatibility, or institutional fear, the FS practice of avoiding night air assets endangers firefighters and reduces management efforts. In addition, critics claim a FS memo, three weeks before the Station Fire, encouraged cost saving measures of quickly replacing “non-federal crews with the service’s own personnel and equipment” on the scene of a fire.³⁵ The peak aviation support for the Station Fire had eight airtankers, seven helicopters, and two very large airtankers on 28 August.³⁶ With the current FS tanker size, the Station Fire would have occupied almost all of the nine airtankers available nationwide.

³¹Ibid.

³²“Station Fire.”

³³“Station Fire,” 28; Paul Pringle, “Critics Say Firefighting Changes Slow to Come Since Station Fire” (Los Angeles: LA Times, 28 April 2011), accessed from <http://latimesblogs.latimes.com/lanow/2011/04/critics-say-firefighting-changes-slow-to-come-since-station-fire.html>; Paul Pringle, “Federal Inspector General Launches Probe of Station Fire” (Los Angeles, LA Times, 4 August 2010), accessed from <http://articles.latimes.com/2010/aug/04/local/la-me-station-fire-20100804>.

³⁴“Station Fire,” 28.

³⁵Paul Pringle, “Before the Station Fire, A Cost-Cutting Memo” (Los Angeles, LA Times, 02 October 2009), accessed from <http://articles.latimes.com/2009/oct/02/local/me-station-fire2>.

³⁶“Station Fire Lessons,” 16–17.

1. An Active Duty Option

Although little research has been conducted examining the potential benefits of a greater role for active duty military forces in wildfire air support, many experts have discussed the benefits and drawbacks of an increased active duty military role in Homeland Security and disaster management scenarios. The continuation of the military assumption of disaster management duties carries into the specifics of aviation support for wildfire suppression. Key arguments reside in the wealth of literature from the federal response to Hurricane Katrina in 2005 and the post 9/11 discussions integrating the active duty military and USNORTHCOM with other federal, state, and local agencies.

One barrier, however slight, to military assumption of wildfire aviation duties rests in the Posse Comitatus Act (PCA). Jennifer K. Elsea wrote for the CRS a piece titled “The Posse Comitatus Act and Related Matters: A Sketch,” which discussed the origins of PCA of 1878, 18 USC § 1385, from Civil War Reconstruction removal of the military occupation and law enforcement duties in former Confederate states.³⁷ According to Elsea, the PCA was intended to bar the Army and later through changes and DOD directives applied to the Air Force, Navy, and Marine Corps from domestic law enforcement duties. Congress has authorized military exceptions by directly giving a branch certain authorities, creating rules for specific assistance, and laws authorizing specific cases.³⁸ The PCA regulations against military law enforcement fail to apply to the use of the military in natural disasters and emergencies, like wildfires.

The CRS also issued a report examining the Stafford Act as the solution to Posse Comitatus limitations on domestic military assistance. In 1988, the Stafford Act amended the 1974 Disaster Relief Act and codified the exceptions for federal, including the military, use in national emergencies. The Stafford Act established “an orderly and continuing means of assistance by the federal government to state and local governments

³⁷Jennifer K. Elsea, “The Posse Comitatus Act and Related Matters: A Sketch,” (Washington, DC: CRS, 21 August 2012), 2, accessed from <https://www.fas.org/sgp/crs/natsec/R42669.pdf>.

³⁸Ibid.

in carrying out their responsibilities.”³⁹ The president of the United States possesses significant latitude to determine the conditions threshold to provided assistance to “supplement State and local efforts and capabilities.”⁴⁰ The request by the state governor establishes the only prerequisite for the president to implement federal assistance. In the case of wildfires, the Stafford Act authorizes the president “to provide assistance, including grants, equipment, supplies, and personnel, to any State or local government for the mitigation, management, and control of any fire on public or private forest land...that threatens such destruction as would constitute a major disaster.”⁴¹ The interpretation of the wildfire clause permits the president to take action “to prevent a forest or grassland fire from becoming a major disaster.”⁴² Through the Stafford Act and the 2006 Post-Katrina Emergency Management Reform Act, the president may utilize all federal agencies to assist in disasters.

The “Federal Response to Hurricane Katrina Lessons Learned” presented an important model of active duty military only aviation wildfire support through USNORTHCOM. The report identified the DOD as “one of the only Federal departments that possessed real operational capabilities to translate Presidential decisions into prompt, effective action on the ground.”⁴³ The DOD employed its large professional manpower, “robust communications infrastructure, logistics, and planning capabilities.”⁴⁴ USNORTHCOM commanded the active duty and Federalized, Title 10, National Guard forces in a cohesive effort.

³⁹Robert T. *Stafford Disaster Relief and Emergency Assistance Act, as Amended, and Related Authorities*, (Washington, DC, FEMA, June 2007) 1, accessed from http://download-88flood.www.gov.tw/otherReC/file/stafford_act_fema_592_june_2007.pdf.

⁴⁰*Stafford Act*, 2.

⁴¹*Stafford Act*, 48.

⁴²Francis X. McCarthy, “Federal Stafford Act Disaster Assistance: Presidential Declarations, Eligible Activities, and Funding,” (Washington, DC: CRS, 7 June 2011), 2, accessed from <https://www.fas.org/sgp/crs/homsec/RL33053.pdf>.

⁴³*The Federal Response to Hurricane Katrina Lessons Learned*, (Washington, DC: The White House Executive Office, February 2006), 54, accessed from <http://library.stmarytx.edu/acadlib/edocs/katrinawh.pdf>.

⁴⁴*Katrina Lessons Learned*, 54.

The Katrina report discovered significant drawbacks from a wholly militarized response. The DOD operates on specific requests from the tiered system of civilian authorities and require presidential authorization to fulfill these requests. The DOD lacks the authority to focus the entire response as “state and local governments maintain operational control over their own resources.”⁴⁵ The primary mission of the military lies in the vital defense of the United States overseas, and the report noted that “the solution to improving the federal response to future catastrophes cannot simply be “let the Department of Defense do it.”⁴⁶

Military units focus on their primary war fighting missions and may lack the proficiency in the highly demanding skill of aerial fire suppression. The crash report for a U.S. Air Force C-130 operating in firefighting duties in 2012 indicated the dangers. While military aviators maintain highly capable and professional flying skills, the rapid switching between regular missions and fire suppression leaves the crews at a disadvantage. The military only option of aerial wildfire suppression expands the existing system of annual rotation of one of four squadrons from the Air National Guard and Air Force Reserves flying the supplemental flights for each wildfire season. The crash report listed recent MAFFS training changes that relaxed the proficiency standards failing “to provide a more realistic learning environment for new and seasoned MAFFS crewmembers.”⁴⁷ Listed in the crash report, the primary cause of the mishap was poor communication of changing weather conditions and pilot error. Reduced crew proficiency at MAFFS missions and high cockpit workloads at low altitudes pose possible contributing factors.

2. National Guard Option

Here, too, there has been little work done focused on the role of National Guard forces in wildfire aviation, but there is a broader literature that can inform our discussion.

⁴⁵*Katrina Lessons Learned*, 72.

⁴⁶*Katrina Lessons Learned*, 54.

⁴⁷“United States Air Force Aircraft Accident Investigation Board Report: C-130H3, T/N 93–1458,” (Charlotte, North Carolina: U.S. Air Force, 27 October, 2012), 34, accessed from http://wildfiretoday.com/documents/MAFFS_crash_report_1-Jul-12.pdf.

Several key authors debate the ramifications of an increased NG employment in domestic emergencies. The general assumption of emergency management flows into the NG expansion beyond support for aviation wildfire management into a full assumption of the federal responsibilities. The discussions touch on the unique hybrid nature of NG assets to operate in either a Title 10 status (federal), state active duty, or default Title 32 status (federal funding under state control).

Shane Crofts analyzed a unique framework in his NPS masters' thesis for the NG following the end of armed conflict in Iraq and eventually Afghanistan. Crofts developed three options to restructure the NG. The first option placed the NG as "primarily a HLS force focused on domestic missions."⁴⁸ The NG would remain a strategic reserve for major conflicts, but it would focus, shape, and train for primary Homeland Security and Defense missions from deliberate and non-deliberate causes. With a drawdown in forces from the past decade plus of war, strategic military planning and force capabilities fall short of national defense obligations without a dual focused NG. Crofts wrote that option one "would require a fundamental paradigm shift in the train-equip-deploy cycle the ARNG has used for the past 60 years."⁴⁹ This option pertains to this thesis in the far-reaching effects of withdrawing valuable assets with a sole focus on wildfire suppression or any Homeland Security mission. The second and third options involve maintaining operational reserve capacity to supplement national level military missions balanced with Homeland Security and Defense responsibilities.

Major T.C. Frantz, USMC, describes the NG as the most logical fit to represent the DOD in the Homeland Security mission set. Frantz envisions a NG focused on emergency management through the "established divisional structure and localized, consolidated response capability" of the modern NG.⁵⁰ Through the "unique federal-state status," the NG offers a close local relationship with first responders, a dispersed

⁴⁸Shane C. Crofts, "Shaping the National Guard in a Post-War Environment," (master's thesis, NPS, September 2012), 38, accessed from <https://www.hsdl.org/?view&did=725827>.

⁴⁹Crofts, "National Guard Post-War," 42.

⁵⁰Maj. T.C. Frantz, "The National Guard—DOD's Logical Homeland Security "First Responder" for the 21st Century" (master's thesis, USMC Command and Staff College, AY 2004–2005), 1–2, accessed from <http://www.dtic.mil/dtic/tr/fulltext/u2/a520237.pdf>.

presence near almost every major population center, and immediate legal authority to operate in any response scenario.⁵¹ The thesis recommends a reorganization of the state-based system into regional units able to respond to individual governors, build relationships and capabilities with first responders, and provide dedicated assets to NORTHCOM.

In 2001, a RAND report on the “Third Annual Report to the President and the Congress of the Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction” provided recommendations directly pertaining to the NG. The report suggested that NG units “be assigned homeland security missions as their primary missions with combat missions outside the United States as secondary missions.”⁵² The NG units would train and equip for primary homeland security missions to include emergency management with state and local first responders.

A 2008 master’s thesis by Lieutenant Colonel Michael S. Steenson presented the NG as a bridge between the DOD and the homeland security mission. Steenson argues that the historic use of the NG from Olympics security duty in 1996 to the post 9/11 airport security missions and combat air patrols, CAP, over major metropolitan areas has established the NG as the DOD homeland security unit. In 2004–2005, NG units provided air and ground assets to operate with and assist Customs and Border Patrol, CBP, agents along the southern border of the United States; the operation saved CBP “over \$8 million...from the combining the command and control structure.”⁵³ The use of state Emergency Management Assistance Compact, EMAC, has permitted state governors to regionally share NG assets in an emergency without involving the lethargic federal government; Steenson remarked that “Florida received help from 35 states during

⁵¹Frantz, “DOD First Responder” 2.

⁵²“Third Annual Report to the President and the Congress of the Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction” (Washington, DC: RAND, 15 December 2001), 52, accessed from <http://www.rand.org/content/dam/rand/www/external/nsrd/terrpanel/terror3-screen.pdf>.

⁵³LCOL Michael S. Steenson, “The National Guard: DOD’s Interagency Bridge to Homeland Security” (master’s thesis, National Defense University Joint Forces Staff College, 14 April 2008), 53, accessed from <http://www.dtic.mil/dtic/tr/fulltext/u2/a487129.pdf>.

the 2004 hurricane season.”⁵⁴ The NG represents the local tier of first responders and accomplishes homeland security missions with the flexibility to avoid intrusive federal government entanglements.

3. A DHS Option

Following the 9/11 attacks, researchers debated the federal shifts of agencies and the creation of DHS. The debates evolved through the federal role, the agencies transferred to DHS, and the national plans for federal responses to terror, later to include all hazards. The resulting DHS force and mission places the seeds for assumption of greater emergency management responsibilities under the federal umbrella.

As delivered in the primary missions of the strategic plan for FY 2012–2016, DHS emphasizes the departmental focus on mitigation of disasters through an all hazards approach. The strategic plan listed the department must “prevent high consequence events by securing critical infrastructure assets, systems, networks, and functions.”⁵⁵ DHS prioritization of hazard mitigation requires greater presence in the growing hazards of wildfire. Fulfilling the all hazards pitch, the DHS goals include a “robust mitigation core capabilities to reduce vulnerabilities.”⁵⁶ The mitigation piece requires active steps and resources to work with state, local, and other federal agencies to reduce a disaster’s impact.

The National Response Framework (NRF) of 2013 provides the responsibilities of the DHS to fulfill the federal commitments for state and local disaster responses. Through included risks, the NRF concludes that “natural hazards—including hurricane, earthquakes, wildfires, and floods present a significant and varied risk across the country.”⁵⁷ As a core tenet of the NRF, DHS advocates and facilitates the implementation

⁵⁴Steenson, “National Guard Bridge” 56.

⁵⁵“Department of Homeland Security Strategic Plan” (Washington, DC: DHS, February 2012), 5, accessed from <http://www.uscg.mil/history/docs/DHS/DHS-StratPlan2012-2016.pdf>.

⁵⁶“Strategic Plan” 15.

⁵⁷ *National Response Framework*, (Washington, DC: DHS, Second Edition, May 2013), 7, accessed from http://www.fema.gov/media-library-data/20130726-1914-25045-1246/final_national_response_framework_20130501.pdf.

of an “effective, unified command” through interoperability. Within DHS, the USCG has “the authority to take action to respond to oil discharges ... including leading the response.”⁵⁸ The NRF illustrates the proactive nature of the DHS to meet the five mission areas of disasters: “prevention, protection, mitigation, response, and recovery”; the exact functions of DHS agencies remain fluid as the system evolves.⁵⁹

A 2005 GAO report championed radical reorganization in the government to confront 21st-century challenges.⁶⁰ The GAO wrote that the government “cannot accept all of its existing programs, policies, and activities as “givens.”⁶¹ The federal government “must take a more systematic, reasonable approach to allocating resources.”⁶² Changes to the system must reflect fiscal limitations of the federal government and responsible preparations for practical, persistent threats and hazards. The GAO recommended the implementation of a drastic “executive reorganization authority” to hasten agency changes without the delays of Congressional oversight.

The GAO released a report in 2006 reflecting the limitations of the post 9/11 response system to endure catastrophic events.⁶³ Following the 9/11 attacks, the federal response shifted away from casual assistance to state and local major emergencies restrained completely by the Stafford Act; the new system, led by DHS, provided proactive assistance and capabilities. The federal government accepted the bill for state and local capabilities enhancements, “with about \$11 billion in grants distributed from fiscal years 2002 through 2005.”⁶⁴ With the lessons of the Hurricane Katrina response, the GAO advocated continued federal capabilities to respond more effectively to large disasters or prevent their formation from smaller disasters. In a post 9/11 and Katrina

⁵⁸*National Response Framework*, 18.

⁵⁹*National Response Framework*, 1.

⁶⁰“21st Century Challenges: Reexamining the Base of the Federal Government” (Washington, DC: GAO, February 2005), accessed from <http://www.gao.gov/new.items/d05325sp.pdf>.

⁶¹*Ibid.*, 12.

⁶²“21st Century,” 40.

⁶³“Emergency Preparedness and Response: Some Issues and Challenges Associated with Major Emergency Incidents” (Washington, DC: GAO, 23 February 2006), 2, accessed from <http://www.gao.gov/assets/120/112855.pdf>.

⁶⁴ *Ibid.*

United States, the GAO wrote that “first responders should be able to respond swiftly with well-planned, well-coordinated, and effective actions to save lives and property.”⁶⁵

E. METHODS AND SOURCES

This thesis uses a policy analysis framework to determine the most appropriate structure for the future of wildfire aviation support. Through review of professional studies and industry documents, this thesis examines the existing model of aviation wildfire support for policy weaknesses/strengths and cultural barriers to industry improvement. This thesis evaluates three alternative courses of action by which different organizations might assume the full federal wildfire aviation suppression responsibilities. An analysis of California’s 2009 Station fire illustrates the existing system processes and shortcomings and provides a touchstone to apply the three alternative operational frameworks.

This thesis examines the societal, legal, financial, and organizational considerations to major changes in defense structure and operations in homeland security. The legal criteria include: political implications to change; and legal requirements, policies, and restrictions. The societal analysis includes popular perceptions and opinions; and national security implications. The financial metric considers the significant budgetary costs and savings of program shifts or creations. The organizational section studies the mission effectiveness, tangible bureaucratic and cultural changes, framework uniqueness, and material assets of the options. In addition, the organizational category utilizes the Station Fire scenario as a touchstone for the different operational methods of the three options.

Additionally, this thesis incorporates decades of industry studies, government reports, cases studies, legal reviews, and lessons learned. Federal government and DOD professional literature for general homeland security tasking form the backbone of the policy options breakdown. Rather than add another critique of a decade of homeland security maturation, the research focuses on the distinctiveness of wildfire suppression and its unique fit into homeland security threats and hazards.

⁶⁵“Emergency Preparedness,” 4.

Through the comparative analysis of the three policy options, the most effective and appropriate policy option reflects a restructuring of wildfire aviation support and does not incorporate any changes to ground efforts or present wildfire management strategies.

F. OVERVIEW

Chapter II scrutinizes the current organizational framework and the background of the 2009 Station Fire in southern California, through the use of aviation assets, the tactical shortcomings, and contemporary abilities to meet another similar wildfire. Chapter III analyzes the full active duty military option, including advantages of capabilities, political roadblocks, primary national security mission costs, and how the option would change the Station Fire scenario. Chapter IV investigates the full National Guard option, including consideration of how NG units would differ from active duty military units, the roles of National Guard in Homeland Security missions, and how the Station Fire would have differed with a National Guard aviation response. Chapter V evaluates the U.S. Fire Guard option, a new armed forces branch under DHS. Such an agency would be organized along the model of the U.S. Coast Guard, and this chapter considers the new agency's advantages compared to the other options, and how the agency might have responded to the Station Fire scenario. Finally, Chapter VI presents policy recommendations and areas for additional study.

This research suggests the National Guard option is the strongest. The National Guard maintains forces spread across all 53 states and territories, placing it in a unique position to respond without major changes to the force. Disaster response plans, like the National Response Framework, support National Guard use in disaster management, and the National Guard dual federal and state roles provide flexibility to operations.

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II. EXISTING CONTRACTED APPROACH

On 26 August 2009, an arsonist started a costly wildfire in southern California that took the lives of two veteran firefighters and highlighted the deficiencies in the current wildfire management organization. This wildfire became known as the Station Fire. The media response to the Station Fire and the public uproar that followed focused on allegations that the Forest Service throttled back its response to conserve funds. The outcry brought political attention to the incident management organization, most notably the administration and use of aviation assets.

This chapter examines the Station Fire and argues that it is a tragic example of this nation's dysfunctional system for fighting wildfires, and in particular of the limitations of current aircraft wildfire fighting methods. The first section of the chapter reviews the history of the Station Fire, while the subsequent sections examine the limitations that this fire demonstrated in the United States' reliance on contracted aviation support, the breakdown of the current contracted system, and the cultural factors that greatly shape the way aircraft are employed to fight wildfires. The chapter concludes by assessing the safety, innovation, and cultural faults with the contract based system.

A. STATION FIRE

With rough terrain, high winds, and accumulated dry vegetation, the conditions were primed for the Station Fire to grow to a dangerous large wildfire. Continuous drought in the western United States left significant dried vegetation around the Angeles National Forest. In late August 2009, southern California's high summer temperatures and low humidity hastened the growth and spread of the blaze after the arsonist' set it at a highway pullout. High winds fanned the flames on the rough terrain and intensified the fire. The Station Fire was destined from the beginning to challenge containment efforts as the fire spread to 15 to 20 acres in the first hour.⁶⁶

⁶⁶“Station Fire,” 11.

The initial report of the fire was made at 1515 on 26 August, and the first units arrived within 15 minutes. A robust initial attack was possible thanks to the already activated suppression efforts on the burning Morris Fire in another part of the Angeles National Forest that permitted a rerouting of several inbound Morris Fire firefighters to the Station Fire. By 1630, some 175 firefighters, 14 fire engines, seven helicopters, and two air tankers had diverted from the Morris Fire and responded in the initial attack of the Station Fire. A moderately experienced incident commander took charge of the response to coordinate the extensive resources on the rough terrain.⁶⁷

Firefighters reported that the flames were eight to ten feet high. According to the 2012 GAO investigation, “agency firefighting doctrine indicates that flame lengths greater than 4 feet are not safe for firefighters using hand tools to attack directly.”⁶⁸ Thus, officials opted for an indirect attack strategy with ground crews flanking the fire on the sides of the slope and airtankers laying retardant barriers at the hill top. The two airtankers dropped 15,000 gallons of retardant, during the afternoon. The seven helicopters delivered a combined 142,000 gallons of water to reduce the fire’s intensity near ground crews.⁶⁹ During the initial attack on the first day, the incident commander turned away a large Martin Mars airtanker that carried important firefighting gel due to a lack of urgency to find a suitable target.⁷⁰ Unable to fly at night due to doctrinal restrictions and equipment capabilities, the airtankers and helicopters returned to their bases just before official nightfall.

The initial attack had only a few hours of daylight to mount a containment plan before night halted almost all efforts. Operations planned for the next day amounted to a “mop-up” operation, rather than a sustained robust response. The moderately experienced commander turned the responsibilities over to a less-experienced commander and

⁶⁷“Station Fire,” 11–14.

⁶⁸“Station Fire,” 12.

⁶⁹“Station Fire,” 11–14.

⁷⁰“Station Fire,” 26. The Martin Mars is a large amphibious airtanker that carried firefighting gel on the evening of Station Fire initial attack. The gel was later dumped on the nearby Morris Fire following confusion, miscommunication, and eventual turn away from the incident commander and aviation coordinator of the Station Fire.

released several ground units, which he believed were no longer needed. The incident commander had ordered only two helicopters for assistance the second day, 27 August. When the reports trickled in that the fire may have escaped containment, the incident commander ordered several airtankers to assist the next morning. The orders for these extra airtankers were placed in an informal request that failed to convert over to an official request, due to forgetfulness by the dispatching agent.⁷¹

In hindsight, the incident commander's actions were clearly insufficient; but they were in keeping with the standard Forest Service practice. In the meantime, with all aircraft on the ground the first night, the incident commander lacked situational awareness of the Station Fire; it escaped containment and grew massively in the dark without aviation support to the ground crews in rugged terrain. In other words, the fire became exactly what official had discounted after those first few hours. A small patch of unburned vegetation known as the "green island" gapped the containment barriers around the wildfire. In the dark, the green island ignited swiftly and spread the wildfire across a highway, well outside the fire lines constructed to hold it back. The incident commander failed to use night-flying helicopters loaned from Los Angeles County to contain the wildfire as it unexpectedly spread beyond the highway barrier. Three night-flying helicopters were in use during the day initial attack, but the incident commander failed to request their continued use during the night.

Even as the blaze expanded out of control the next day, the incident management system failed to utilize crucial aircraft assets. Vital airtankers and helicopters remained unutilized in the vicinity of the Station Fire. The untapped resources included ten contract airtankers in southern California that could have reached the fire early in the morning and three CAL FIRE, (California's state-run fire service) airtankers that CAL FIRE held in strategic reserve, not for use by Forest Service.

More was at work in these decisions than the misapprehension of the fire's size. Budget concerns predominated—and made everything much worse. Later testimony by

⁷¹"Station Fire," 29. The Department of Agriculture's Inspector General determined that the lack of phone recordings for extra airtankers did not exist and could not determine the cause of the lost informal request. However, changes to the official procedures and recordings of all GACC request lines were implemented to prevent a reoccurrence.

incident commanders and other wildfire experts highlighted fiscal austerity as a cause for resource restraint on the Station Fire. A Forest Service memo, released just before the Station Fire, described an impending budgetary shortfall and urged officials to use Forest Service assets before state or contracted resources, even if those assets were closer.⁷² The increasing costs of wildfire aircraft, operation and maintenance, depleted the wildfire suppression funds and contributed to the budget shortfall.

The incident commander adhered to the official Forest Service moratorium on night flying. These restrictions against night flying owed to the framework based upon the use of contracted assets. Without any departmental motivation to incorporate already common innovations like night-vision devices, the Forest Service in 2009 maintained the official doctrine that the “risks of flying at night outweigh the benefits.”⁷³ The contract system failed to incentivize aircraft vendors to innovate or acquire newer, night-capable aircraft, and so the safe and very, common capability of night flying was unavailable to challenge the outdated Forest Service regulation. Ultimately, the vendors lacked any incentive to dispute Forest Service regulations as either way, day or night, their contracts were paid; day flying allowed them to keep using older aircraft and save the overhead from purchasing new, more advanced ones. Thus blame for the Station Fire escape and escalation falls on the restraining Forest Service doctrine and the passive contract-based framework.⁷⁴

The incident commanders were too preoccupied with fiscal constraints to form a sufficiently thorough plan to contain the wildfire. In the end, this calculus proved penny-wise but pound-foolish; the ultimate costs included the lives of two firefighters, the scorching of 160,000 acres, the destruction of 89 homes, the efforts of some 5,200

⁷²“Station Fire,” 37; Pringle, “Station Fire Cost.”

⁷³“Station Fire: Forest Service’s Response Offers Potential Lessons for Future Wildland Fire Management” (Washington, DC: GAO, December 2011), 27, accessed from <http://www.gao.gov/assets/590/587075.pdf>.

⁷⁴“Station Fire,” 31–32; “Station Fire Lessons Learned Report,” (USDA Forest Service, October 2010), 1–5, accessed from http://wildfiretoday.com/documents/Station_Fire_Lessons.pdf. Without a pooled system organizing the nations aviation assets, the structure remains fractured and unable to properly support and coordinate wildfires across jurisdictional boundaries.

firefighters, and \$95 million before the blaze could be declared extinguished on 4 December.⁷⁵

B. CONTRACT-BASED SYSTEM

Response for the Station Fire followed the U.S. wildfire management strategy of an escalating commitment of resources and priorities based through the incident management system. Within the National Response Framework (NRF) and the National Incident Management System (NIMS), the wildfire Incident Command System and Wildland Fire Complexity describe the evolution from small to large fires.⁷⁶

1. Existing Wildfire Management Strategies

Upon discovery of a wildfire ignition, local units assess the developing incident and risks in the initial response phase. The initial response phase encompasses the “immediate decisions and actions taken to react to an ignition.”⁷⁷ Usually the responsibility of local fire departments, the initial response includes action, the decision to delay actions, and their rationale. When actions are taken to manage the wildfire by the first resources to arrive, the initial attack phase begins; these actions include “size up, patrolling, monitoring, holding action, or aggressive initial attack.”⁷⁸ Generally, initial attacks are characterized by the least complex wildfire with “a single resource (Type 5) to several single resources (Type 4),” and an anticipated containment within one operational phase.⁷⁹

⁷⁵“Station Fire,” 1.

⁷⁶*Interagency Standards for Fire and Fire Aviation Operations*, (Washington, DC: Department of the Interior and Department of Agriculture, January 2013), 08–13.

⁷⁷ *Interagency Standards Fire Aviation*, 09–3.

⁷⁸“Wildland Fire Incident Management Field Guide” (Boise, ID: National Wildfire Coordinating Group, January 2014), 29, accessed from <http://www.nwcg.gov/pms/pubs/pms210/pms210.pdf>.

⁷⁹“Fire Incident Field Guide,” 29; FEMA, “Incident Complexity” (Washington, DC: DHS), accessed on 02 July 2014 from <http://www.training.fema.gov/EMIWeb/IS/ICSResource/assets/IncidentTypes.pdf>; National Park Service, “Fire and Aviation Management” (Washington, DC: U.S. Department of the Interior) accessed 02 July 2014 from <http://www.nps.gov/fire/wildland-fire/learning-center/fire-in-depth/incident-command-system-levels.cfm>. An operational phase is defined the given time required to execute a set of tactical actions, usually 12 hours, but the initial attack may last up to 24 hours from the first report of wildfire.

If the initial attack fails to contain the wildfire or if it grows too rapidly, the incident transitions to the extended attack phase and additional contingency resources and prioritization are given to the wildfire incident. The typical extended attack phase is a Type 3 incident with less than 100 acres consumed, increased resources, greater attention, and expectations that additional time is required to contain the wildfire than the initial attack.⁸⁰ The extended attack concludes when the wildfire is contained or controlled or the incident management escalates into a more complex large fire incident. Though a small percentage of wildfires, a large fire requires immense resources, organization, support, and incident management professionals for a Type 2 or Type 1 event.⁸¹ Eventually, the incident concludes with the containment or suppression of the wildfire.

The Station Fire began as a Type 4 incident and grew into a Type 3 during the initial attack. In the height of the wildfire spread, a Type 1 commander led more than 5000 firefighters and flight crews.

Wildfire management doctrines emphasize the importance of a dominant initial attack. Released in 2012, the Forest Service’s “Large Airtanker Modernization Strategy” aims to support robust initial attack resources with faster, longer range, and higher capacity airtankers able to respond to isolated fires rapidly. The Modernization Strategy added that a “1.5% drop in initial attack success rate is estimated to represent approximately 150 fires that could escape initial attack, which would cost the Forest Service an additional \$300 million to \$450 million to suppress.”⁸² The 2013 *Interagency Standards for Fire and Fire Aviation Operations* claims that “fires are easier and less expensive to suppress when they are small...full suppression, aggressive initial attack is the single most important method to ensure safety of firefighters and the public and to limit suppression costs.”⁸³ The Department of the Interior’s and the Department of

⁸⁰ “Fire Incident Field Guide,” 35; FEMA, “Incident Complexity”; National Park Service, “Fire Aviation Management.”

⁸¹ “Fire Incident Field Guide,” 36–40. Type 2 wildfires have significant staff and infrastructure for sustained wildfire suppression and containment efforts. Type 1 wildfires extend the Type 2 resourcing to “exceed 500 people per operational period.”

⁸² “Large Airtanker Modernization Strategy,” 4–5.

⁸³ *Interagency Standards Fire Aviation*, 01–8.

Agriculture’s 2014 “National Strategy” echoed this theme, declaring “safe aggressive initial attack is often the best suppression strategy to keep unwanted wildfires small and costs down.”⁸⁴ The Station Fire maintained a strong initial attack during the few hours before nightfall. After dark, the fire had several hours of unimpeded growth before the incident commanders even knew the fire had escaped containment efforts and even longer before daylight could permit resumed attacks.

Wildfire management actions follow two separate suppression strategies: direct attack and indirect attack. Both strategies include extensive use of ground crews with picks and shovels, earthmoving heavy equipment, and aircraft. In rough terrain with steep slopes, aircraft provide the most accessible assets to attack with either strategy.

Direct attack represents the suppression efforts that attempt to both extinguish the existing burning materials and prevent continued spread.⁸⁵ With focused efforts right at the wildfire’s edge, direct attack includes use of water and other suppressants to extinguish burning material and the construction of a fireline or barrier holding the fire’s advance.

Indirect attack takes place a distance away from the spreading wildfire to contain the long-term growth; indirect attack does not include efforts to extinguish already burning material.⁸⁶ Suppressants and retardants combine with physical firelines and barriers to affect an indirect attack. A controlled burn or backfire is used in an indirect attack to consume easily ignited material, usually underbrush, to reduce susceptible fuel for the growing wildfire and change the advancing course.⁸⁷

⁸⁴“The National Strategy: The Final Phase in the Development of the National Cohesive Wildland Fire Management Strategy” (Washington, DC: The Department of the Interior and The Department of Agriculture, April 2014), 4, accessed from <http://www.doi.gov/news/loader.cfm?csModule=security/getfile&pageid=526008>.

⁸⁵“Glossary of Wildland Fire Terminology” (Boise, ID: National Wildfire Coordinating Group, July 2012), 58, accessed from <http://www.nwcg.gov/pms/pubs/glossary/pms205.pdf>. Direct attack is defined as “any treatment applied directly to burning fuel such as wetting, smothering, or chemically quenching the fire or by physically separating the burning from unburned fuel.

⁸⁶“Fire Incident Field Guide,” 33; “Glossary Fire Terminology,” 107.

⁸⁷“Glossary Fire Terminology,” 33; “Fire Improvements Needed,” 8.

Wildfire management direct and indirect strategies employ a host of different chemicals in specific roles. Retardants deter or slow combustion, and suppressants extinguish or contain ignited fuels. Delivered via airtankers or fire engines, retardants are “a substance or chemical agent which reduces the flammability of combustibles;” many retardants have chemicals or salts that “change the way fuels burn.”⁸⁸ Short-term retardants work to deter combustion only as long as they remain wet; long-term retardants “are effective even after the water has evaporated.”⁸⁹ Large airtankers can lay long swaths of retardants to assist in the direct or indirect attacks. Fire suppressant foams combine chemicals with water to increase the adhesive, smothering, moistening, or cooling properties of water.

When the water is evaporated, fire suppressant foams cease effectiveness.⁹⁰ Increasing the “viscosity and adhesion” of water, fire-fighting gels and other water-enhancers provide more effective firefighting tools than ordinary water, but they lose their effectiveness when the water has evaporated.⁹¹ Plain water offers short-term fire suppression through cooling and wetting fuels and has a smaller price tag than chemical enhancers. Scooper airtankers and helicopter bucket delivery system deliver high cycle lifts of water from bodies of water near wildfires.

2. Wildfire Aircraft

With unique capabilities of speed and accessibility, aircraft can rapidly deploy to remote and rugged terrain that would hinder ground crews. Aircraft fill the following roles: deploying water, fire suppressants, and fire retardants; detection and tracking of wildfires; observation, command, and control of wildfire strategies; transport and evacuation of ground crews to and from remote areas; air ambulance; aerial resupply of ground crews; and aerial ignition of controlled burns.

⁸⁸“Glossary Fire Terminology,” 149; *Interagency Standards Fire Aviation*, 12–1.

⁸⁹“Glossary Fire Terminology,” 156; “Glossary Fire Terminology,” 116; *Interagency Standards Fire Aviation*, 12–1.

⁹⁰“Glossary Fire Terminology,” 85; *Interagency Standards Fire Aviation*, 12–1.

⁹¹*Interagency Standards Fire Aviation*, 12–2.

Within the United States, the fleet of aircraft involved in wildfire management falls into several distinct categories. Fixed-wing (airplanes) and rotary-wing (helicopters) complement each other in the same roles but fall under different groupings. The airtanker category covers all fixed-wing aircraft that deliver water and fire retardants in accordance with the management strategy to contain, slow, or extinguish wildfires. The smokejumper category is all fixed-wing aircraft that deliver parachuting smokejumpers and supplies to remote areas. With the utility and multi-mission capabilities of helicopters, the broad rotary-wing category covers all helicopters regardless of their specific purpose or configuration. The fixed-wing surveillance aircraft category includes light observation aircraft that provide command and control of aerial assets around a wildfire. In addition, surveillance aircraft direct ground firefighting efforts and “guide airtankers over fires to assist in accurately targeting retardant delivery.”⁹²

Authorities break airtanker groupings into further subcategories based on performance and function. Maxing out the airtanker volume, very large airtankers deliver a minimum 8000 gallons of retardant; they are generally retrofitted commercial aircraft DC-10s and Boeing 747s with 11,600- and 20,000-gallon capacities, respectively.⁹³ Large airtankers carry a minimum of 1800 gallons and are subdivided into Type 1, over 3000 gallons; and Type 2, 1800 to 2999 gallons. Large airtankers include legacy P-3 Orion, C-130, P2V, C-27J, and other former military cargo planes and commercial aircraft converted into airtankers.⁹⁴ Large and very large airtankers possess high cruising speeds and long ranges ideal for large areas of response. Type 3 and Type 4 airtankers carry 800–1799 and less than 799 gallons, respectively.⁹⁵ Within these groups, water scoopers are amphibious aircraft capable of scooping or siphoning water from accessible

⁹²“Fire Improvements Needed,” 6; “Interagency Aviation Strategy,” 21–24.

⁹³Bill Gabbert, “Possibilities for “New Generation Air Tankers,”” Wildfire Today, posted on 2 December 2011 on <http://wildfiretoday.com/2011/12/02/possibilities-for-new-generation-air-tankers/>; “Fire Improvements Needed,” 6. At less than a decade of service, Very Large Airtankers are a relatively new addition to the U.S. wildfire fleet, and the Forest Service has yet to rearrange the Type system to include them. So Very Large Airtankers remain their own type.

⁹⁴Gabbert, “New Generation Air Tankers”; “Fire Improvements Needed,” 6.

⁹⁵“Large Airtanker Modernization Strategy,” 3.

bodies of water to dump on wildfires.⁹⁶ Additionally in Type 3 and 4, single-engine airtankers (SEATS) represent low-cost airtankers based off retrofitted crop-duster aircraft like the Air Tractor series.⁹⁷

3. Wildfire Dispatch

The U.S. wildfire management system utilizes a coordinated request process to deploy aviation assets to wildfire incidents. The request system integrates federal, state, local, and tribal assets through a regionalized, hierarchical chain for resources. At the lowest level, local dispatch centers take delivery of reports of wildfires and assign local firefighters, fire trucks, equipment, and aircraft to respond, when available; the local dispatch centers can operate independently in a closed-loop or within collective agreements with other local jurisdictions for mutual support. The local dispatch centers coordinate “initial attack responses and the ordering of additional resources when fires escape initial attack.”⁹⁸

If local units lack adequate resources for a wildfire or the initial attack fails, the local dispatcher requests additional resources from their assigned geographic area coordination center (GACC). Each GACC determines priorities, resource allocation, and contingency mobilization within their region.⁹⁹ GACCs are a series of eleven interagency run regional dispatch centers that coordinate resources and response efforts for escalated wildfire management incidents. When GACCs need additional assets, they request to the National Interagency Coordination Center (NICC), located at the National Interagency Fire Center (NIFC) in Boise, Idaho. The NICC “coordinates allocation of resources to one or more coordination centers or major fires within the nation,” in addition to coordinating responses to other non-wildfire national incidents.¹⁰⁰ The NIFC is the

⁹⁶“Interagency Aviation Strategy,” 24.

⁹⁷“Interagency Aviation Strategy,” 23.

⁹⁸*Interagency Standards Fire Aviation*, 08–5.

⁹⁹*Interagency Standards Fire Aviation*, 08–5; “Fire Improvements Needed,” 8.

¹⁰⁰“Glossary Fire Terminology,” 125; “Fire Improvements Needed,” 7–8.

primary body for allocating, assigning, and coordinating firefighting assets, equipment, standards, doctrine, and policies at the national level.¹⁰¹

The United States has international cooperation agreements for wildfire resources with Canada, Mexico, Australia, and New Zealand.¹⁰² The NIFC continuously coordinates Canadian and Alaska mutual wildfire cooperation in air and ground support well beyond the immediate borders.¹⁰³ In addition, the NIFC facilitates supplementing the recently deficient U.S. airtanker fleet with Canadian airtankers.¹⁰⁴

4. Wildfire Contracts

The contract-based system for aviation assets relies on a divided, multilayered operational framework. The FS and the BLM divide the contracts for aviation wildfire assets between categories. The Forest Service holds the responsibility for wildfires occurring on “national forests and national grasslands.”¹⁰⁵ In addition, the FS negotiates and maintains contracts for large and very large airtankers and large and medium helicopters. Conversely, the Bureau of Land Management maintains responsibility for wildfires on “national parks, wildlife refuges, and preserves, and Indian reservations, and on public lands.”¹⁰⁶ The BLM also manages the contracts for SEATS and scoopers.

¹⁰¹“NIFC Home” The National Interagency Fire Center, accessed 10 June 2014 from <http://www.nifc.gov/>.

¹⁰²*Interagency Standards Fire Aviation*, 08–18; “National Interagency Mobilization Guide” (Boise, ID: National Interagency Coordination Center, March 2012), 53, accessed from https://www.llis.dhs.gov/sites/default/files/2012_Mobilization_Guide.pdf. Since 1999, the U.S.–Mexico Cross Border Cooperation on Wildland Fires permits the other nation to enter 10 miles into the others territory to suppress wildfires; the efforts are coordinated by the GACCs. Since 1982, the U.S.–Canada, Reciprocal Forest Firefighting Arrangement has annual cooperation and coordination for wildfire management in the border regions and mutual resource requests. The U.S. Australia/New Zealand Wildland Fire Arrangement facilitates formal requests for mutual exchanges of resources during projected shortages.

¹⁰³“B.C. Send Firefighters, Helicopter to Fight Alaska Blazes” (Alberta, Canada: The Canadian Press, 24 May 2014) accessed from <http://www.ctvnews.ca/canada/b-c-sends-firefighters-helicopter-to-fight-alaskan-blazes-1.1836360>; The Associated Press, “Alaska-based Firefighters Head South to Help Fight Fires in the Western U.S.” (Columbus, Indiana: The Republic, 17 July 2014), accessed from <http://www.therepublic.com/view/story/f72dca963cc74b239d2ad14d4346153f/AK--Western-Wildfires-Alaska.Canadian.and.U.S.> Alaskan crews fought wildfires in the others country in the summer of 2014, continuing the long standing trend of mutual assistance.

¹⁰⁴“Firefighting Aircraft Study,” 37. Canadian airtankers took 11 percent of the U.S. airtanker filled requests in 2011.

¹⁰⁵Bracmort, “Wildfire Federal Funding,” 5.

¹⁰⁶Bracmort, “Wildfire Federal Funding,” 5; “Fire Improvements Needed,” 9.

The contract-based system utilizes two types of contracts: exclusive-use and call-when-needed (CWN). The exclusive-use contracts entitle wildfire management to complete use of the aircraft during the contracted times and available at anytime during a “mandatory availability period.”¹⁰⁷ Generally wildfire management officials contract large airtankers and helicopters on exclusive use for entire fire seasons. CWN contracts permit the vendors to perform other earning tasks with the aircraft, like crop dusting, cargo, or logging.

When the CWN is activated, the vendor has a requisite response time to have the aircraft and crew available for wildfire tasking. Like a retainer, per-day fees reflect the vendor’s loss of the aircraft to perform other paying contracts. Per-flight hour fees reflect the costs incurred in fuel, operation, and maintenance of the aircraft. Exclusive-use contracts include both per-day fees and per-flying-hour fees. Incurring only high per-flight hour fees, CWN contracts are more expensive per day when flown than exclusive-use, but they offer flexibility to adjust the size of the fleet as the season progresses.¹⁰⁸

The contracted fleet varies on fulfillment of demand depending on the levels of requests and seasonal fire intensity, but airtankers fill approximately 60 percent to 75 percent of the orders each year.¹⁰⁹ Plagued by poor maintenance and structural fatigue from airtanker duties, the large airtanker contractor fleet fell from 44 aircraft in 2002 to only 8 in 2013.¹¹⁰ The year 2011 saw 11 percent of requests filled by Canadian airtankers and contracted by Alaska with cooperation of the Forest Service.¹¹¹

C. AIRCRAFT COSTS AND FUNDING

The contract-based model for aviation has caused the federal wildfire suppression costs to escalate since 2000. As the general appropriations for wildfires increased, the expense of aviation assets increased. Due in part to amplified demand with historically

¹⁰⁷“Fire Improvements Needed,” 9.

¹⁰⁸“Air Attack Wildfires,” 11.

¹⁰⁹“Firefighting Aircraft Study,” 36.

¹¹⁰“Fire Improvements Needed,” 1.

¹¹¹“Firefighting Aircraft Study,” 37.

massive wildfire seasons and drought conditions in the western United States, the initial budget requests from the Forest Service and BLM have fallen short and forced mid-season budget scrambles to find the additional funding.

The elevated wildfire threat and management strategies' dependency on aggressive use of aviation assets has strained the existing fleet. Airtankers have increased their annual flight hours and increased the wear on ageing aircraft.¹¹² With the average age of large airtankers at 50 years, additional stress and increased annual usage shortens the airtanker fleet's safe and cost-effective life span. The increased usage in the early 2000s forced an early retirement on several airtankers and increased the burden share on the remaining aircraft, exacerbating the individual wear.¹¹³ As a result of the 2002 fatal mishaps and the political fallout, the Forest Service, in 2008, required contractors to establish an intricate safety inspection and maintenance program to comply with stricter FAA standards.¹¹⁴ Though an improvement to the safety of wildfire aviation, these additional maintenance costs have risen to keep the aged fleet operational, and contractors pass that expense on to the contracting agencies. Daily airtanker costs have doubled from 2007 to 2010, increasing from \$15 million to \$33 million.¹¹⁵ The contract-based model for the Forest Service has not accommodated the increased costs, nor has the Forest Service found a suitable alternative.

The modernization plan for the Forest Service includes perpetuation of the same cycle of contract-based maintenance and operation with federally procured former military use aircraft. The Station Fire incident commanders were influenced to restrain resources out of aviation cost concerns. The hesitation allowed the wildfire to expand and cost over \$95 million to finally contain.

Changes in the federal funding practices have altered the fiscal controls in dealing with increased costs for wildfire suppression. Traditional funding provided in excess of two thirds of the federal fire funding to the Forest Service and the remaining third to the

¹¹²“Large Airtanker Modernization Strategy,” 2.

¹¹³“Fire Improvements Needed,” 2.

¹¹⁴“Large Airtanker Modernization Strategy,” 5.

¹¹⁵*Ibid.*

Department of the Interior’s Bureau of Land Management. During the 1990s, the Forest Service and Bureau of Land Management averaged wildfire suppression appropriations at \$.92 billion. From 2002 to 2012, the same funding has ballooned to average \$3.13 billion, with a peak of \$4.47 billion in 2008.¹¹⁶ The Forest Service and Bureau of Land Management spent greater than “\$2.4 billion on federally- contracted firefighting aircraft, fuel, and retardant.”¹¹⁷ Historically, surge funding for extreme wildfire years came from Congressional supplemental emergency funds propping up internal departmental fund reorganization and repurposing by the FS. The FS borrowed money from the Knutson-Vandenberg (K-V) Fund, a \$500 million fund from harvested timber proceeds on government lands to replant within three years, and congress would appropriate funds to repay the K-V Fund balance.

In 2010, the Federal Land Assistance, Management, and Enhancement (FLAME) Act established wildfire suppression reserve funds for the FS and BLM to permit suppression efforts without restrictions or unnecessary fiscal restraint. According to University of New Hampshire professor, Dr. Ross Gorte, the FLAME Act removed fiscal responsibility from the wildfire management effort and “provides no incentives to reduce or constrain the firefighting costs.”¹¹⁸ In 2009, the Station Fire fiscal worries restrained an aggressive attack, and so the prior to the FLAME Act the opposite over reaction gripped incident commanders. In comparison, spending an extra few thousand for more aircraft could have alleviated the \$95 million final price.

D. EFFECTS OF THE CONTRACT-BASED APPROACH

The poorly crafted contracts for airtankers have worsened the wildfire aviation fiscal and performance problems. The Forest Service issues short-term—usually annual—contracts that leave vendors without long-term assurances of income. In the absence of long-term predictability, vendors elect to make do with patching together

¹¹⁶Ross Gorte, “The Rising Cost of Wildfire Protection,” (Bozeman, MT: Headwaters Economics, June 2013), 4, accessed from <http://headwaterseconomics.org/wphw/wp-content/uploads/fire-costs-background-report.pdf>; National Interagency Fire Center, “Federal Firefighting Costs (Suppression Only)” accessed on 08 July 2014 from http://www.nifc.gov/fireInfo/fireInfo_documents/SuppCosts.pdf.

¹¹⁷“Fire Improvements Needed,” 3.

¹¹⁸Gorte, “Rising Cost Wildfire Protection,” 8–9.

existing assets at the loss of lasting sustainability and growth. Vendors see no financial benefit for acquiring new assets with uncertainty of their recoupment on investments. Safety is continuously sacrificed when contracts penalize aircraft unavailability for service; thus, the long used FAA “public-use” status permitted maintenance loopholes for cost shaving vendors to fly unsafe aircraft. With the increased safety inspections on worn out aircraft and risk acceptance, the contract-based system experiences cost increases with minimal benefit to wildfire suppression.¹¹⁹

1. Maintenance and Safety

Poor aviation safety culture and maintenance practices remain at the forefront of criticism against the contract-based framework. The 2002 Blue Ribbon Panel found safety an underlying cause of excessive costs of wildfire suppression. Since 1958, the “abysmal” safety record for wildfire aviation has seen 136 large airtanker crew members die in aircraft mishaps.¹²⁰ Contract personnel maintain a lower safety standard than their government counterparts due to their aircraft maintenance and operational flight envelopes.

Post-military aircraft converted to airtanker duties maintain an FAA “public-use” status that rests all safety considerations and inspections with the proprietor for airworthiness. The use of the aircraft for government functions qualify them as “generally exempt from complying with Federal Aviation Regulations.”¹²¹ The FAA only requires an operator to “advise regional FAA officials that the aircraft was designed and built for a military mission, and that the aircraft is not unsafe when operated in the firefighting role.”¹²² All former military airtankers operate under the “public-use” status.

The contract-based system leaves the airworthiness and safety of individual aircraft, including publicly owned but maintained and operated under contract, with the

¹¹⁹“Federal Aerial Firefighting: Assessing Safety and Effectiveness” (Blue Ribbon Panel, December 2002), 32–33, accessed from http://wildfiretoday.com/documents/Blue_Ribbon_Panel_Final_12-05-2002.pdf.

¹²⁰“Federal Aerial Firefighting Effectiveness,” 4.

¹²¹“Federal Aerial Firefighting Effectiveness,” 27–28.

¹²²“Federal Aerial Firefighting Effectiveness,” 28.

vendor. The operational model of contracts incentivizes the vendor to profit and stretch the airworthiness and safety of the aircraft, without any oversight or accountability by the FAA or the FS. Even worse, the Blue Ribbon Panel found that the FS and BLM officials fail to understand the FAA certification and oversight duties for FS- and BLM-contracted aircraft. The failure of FS safety policies culminated in two fatal aircraft structural failures in flight in 2002, but FS waited nine years, until 2011, to remove the remaining similar aircraft from flying status.¹²³ The 2014 airtanker fleet still includes many legacy Korean War-era aircraft.

2. A Stagnant Culture

With decades of inadequate contract funding and cost-inefficiencies, the wildfire aviation culture has evolved over time to accept insufficient standards and make do with the inferior assets and training. The brave “can-do” attitude has served both effectively and deadly; the missions are completed but at the cost of indispensable human and aircraft capital. One aviation officer said that wildfire aviation is “captured by our own success; we always manage to find a way.”¹²⁴

The aviation wildfire culture fostered by the contract-based model has eroded safe and effective aviation operations. From the top down, the wildfire aviation community has developed a dysfunctional cultural process. Federal officials lack sufficient oversight of contractors and an understanding of safe aviation practices, as was evident in the 2002 mishaps and following investigations. The Forest Service failed to understand the FAA “public-use” status of their contracted aircraft and the deplorable safety standards maintained by the vendors. The 2002 Blue Ribbon Panel concluded that the “Forest Service has exploited the passion and willingness of its firefighters to do more with less.”¹²⁵ For large airtankers in particular, the average 15- to 20- year life cycle of

¹²³“Federal Aerial Firefighting Effectiveness,” 27; “Fire Improvements Needed,” 1. In 2002, two aircraft experienced wing separation from the aircraft while conducting airtanker missions. A 1957 former military cargo plane then converted airtanker, C-130A aircraft wing separated in flight on a retardant drop killing all three crew. A 1950s former military surveillance aircraft then converted tanker, PB4Y-2 experienced a similar wing separation in flight killing both crewmembers.

¹²⁴“Federal Aerial Firefighting Effectiveness,” 23.

¹²⁵“Federal Aerial Firefighting Effectiveness,” 23.

contractor aircraft types has disastrously ended with engineering or structural failures, usually fatal. The aircraft were flown until the problems were publicly unacceptable; the wildfire careers of B-17s, C119s, PB4Ys, and C-130As ended with catastrophic losses.¹²⁶

The government leadership's apathetic transfer of all safety and maintenance responsibilities to the vendors created an accountability void. The government believed the vendors would maintain high safety standards of operation and maintenance without oversight. The vendors took advantage of the disconnect to operate substandard maintenance on aged aircraft flown in structurally stressful maneuvers, without consequences until a few of them fell out of the sky.

The risk acceptance and inflexible culture encourages experience and skill over deliberate risk mitigation measures. Insulated in tradition, the culture refuses to adapt with other aviation fields or evolve through analysis of current methods. Contractor aircrews and the Forest Service are reluctant to perform comprehensive effectiveness studies due to fears of how the information will be used against them. The GAO has commented that the firefighting culture, "values experience and history over data and scientific analysis."¹²⁷ The resistance to reform has hampered national studies to better equip and fund wildfire aviation.

The Station Fire was restricted to age-old methods of traditional dropping of retardant and water during the day only. With more analytical study of effectiveness and methods, the aviation tactics could increase efficiencies, reduce wildfire costs, and prevent more large wildfires.

3. Innovation

The contracting model provides little encouragement for the vendors or wildfire managers to innovate the strategies and capabilities of wildfire suppression assets. Forest Service and BLM contracts fail to financially encourage basic replacement assets from vendors and least of all promote advancements in tools and techniques. The U.S. military

¹²⁶"Federal Aerial Firefighting Effectiveness," 12.

¹²⁷"Fire Improvements Needed," 16.

has pioneered and long employed night flying with the aid of infrared and night-vision devices (NVD), but wildfire aircraft contractors and wildfire managers have failed to integrate their use. Commercial, civil, and military aircraft incorporate traffic collision-avoidance systems (TCAS) into standard equipment, while only one airtanker vendor has implemented the safety system.¹²⁸ Contractors fail to incorporate other safety equipment common in other aviation communities such as: flight data and voice recorders for mishap investigations and accelerometers to measure aircraft stress levels.¹²⁹ Similarly, although UAVs are growing more prevalent in civil and military use, they have only achieved early testing and evaluation status in wildfire management through NASA and other agencies.

The Forest Service and the BLM have failed to view wildfire aviation as national assets that require sufficient mobility and coordination to meet a national standard for operational procedures and techniques. Assets are forced to meet the most restrictive standard of the wildfire incident commander's home agency (state, local, Forest Service, or BLM) and conform to varied operational restrictions over different jurisdictional airspace. Beyond a lack of forward thinking, the contract-based model has smothered innovations in favor of historical methods.

The Station Fire could have benefited from increased innovation. UAVs would have provided continuous situational awareness to discover gaps and escapes in containment strategies. NVDs and night flying could have maintained the attack on the fire to contain it the first night. The Station Fire needed scientific methods and modern aircraft to prevent the wildfire's escape, and without them it killed two firefighters and nearly threatened east Los Angeles.

E. CONCLUSION

To date, little reform has taken place within the operational structure or aviation organization of wildfire incident management. The existing contract-based framework is broken and a new operational model must arise to replace the dysfunctional structure. A

¹²⁸“Federal Aerial Firefighting Effectiveness,” 32.

¹²⁹“Federal Aerial Firefighting Effectiveness,” 33.

shortage of assets only exhibits a symptom of the greater problems hidden in the internal cultures and lack of incentives found in the contract model. Worthwhile in other businesses, the contract-based model has eroded Forest Service and BLM leadership to cast off responsibilities for safe aircraft for their crews to unmotivated vendors and inhibited growth of the wildfire management enterprise. The firefighting professionals on the ground and in the air deserve a system that efficiently utilizes resources and prioritizes safety on par with mission accomplishment.

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III. ACTIVE DUTY MILITARY OPTION

The Station Fire illustrated the flaws in the contract-based approach to wildfire aviation, but a deliberate analysis asks what other models exist to fill the aviation void. With out of control costs, cultural barriers to adaptation, and appalling safety standards, the contract-based model has failed to meet the ever-increasing hazards of wildfires. Various alternative solutions exist from simply retooling the current organization to complete replacement of the entire aviation program by another entity. This thesis will examine possible alternatives for the latter.

The first alternative would have the active duty military assume aviation responsibilities from the contract-based organizational framework for wildfire support. Under this option, the active duty military services, their respective reserve forces, and Title 10 National Guard forces would accept full responsibility for aviation fixed-wing, rotary-wing, and UAV operations to fulfill the mission requirements of nationwide wildfire management. This chapter will examine the basic principles and appropriateness of the active duty military take-over of aviation wildfire through a legal/social analysis, a fiscal examination, and an organizational study. Finally, this chapter will apply the active duty military option to the Station Fire and examine the altered outcome.¹³⁰

A. LEGAL/SOCIETAL/NATIONAL SECURITY ANALYSIS

Active duty military operation within the domestic United States faces specific challenges. Significant legal restrictions bare specific functions of the military within the homeland. Societal reactions and perceptions perceive the roles and actions of the active duty military in certain ways. Tangible risks are associated with reprioritizing military resources without additional assets to meet the new challenges.

In the wake of the political restructuring in the years after 9/11 and Hurricane Katrina, domestic military operations and assistance in the United States have become

¹³⁰The physical resource organization and particular airframe requirements are beyond the scope of this thesis. Additional study should focus on the effectiveness of each category of aircraft currently employed and potentially utilized in the future.

more frequent and more accepted. The establishment of the U.S. Northern Command (NORTHCOM) has fortified the societal legitimacy and accountability of defense missions within the homeland, however homeland security still remains secondary to the overseas national security military missions.¹³¹ The prioritization of defense missions and force shaping remains focused on a global presence and engagement, while retaining sufficient forces for homeland defense and Defense Support for Civil Authority (DSCA) missions.¹³² The wartime demands for military forces overseas reduce the mission prioritization and pool of extra active duty forces available for homeland security missions.

Historically, the prospect of general domestic military operations has aroused extensive opposition. The American public has a track record of skepticism and even outright hostility for military use within the United States, in particular military use in law enforcement. With extensive capabilities and often the only organized force, the military has responded to various disasters throughout the United States history from the 1906 San Francisco Earthquake to Hurricane Katrina.¹³³ In contrast, the military itself has resisted too much domestic responsibility and resists permanent DSCA mission areas in both lead agency and dedicated resource capabilities, unless directed by the Secretary of Defense.¹³⁴ The American people, as well, maintain a fear of creating a praetorian military, disconnected from the larger social order. The Posse Comitatus Act established a statutory moratorium for military employment in enforcing laws, but statutory restrictions change with societal expectations, as the Stafford Act has for the DOD in

¹³¹William Knight, "Homeland Security: Roles and Missions for United States Northern Command" (Washington, DC, CRS, RL34342, 3 June 2008), 2 Summary, accessed from <https://www.fas.org/sgp/crs/homsec/RL34342.pdf>.

¹³²U.S. Department of Defense, *Strategy for Homeland Defense and Defense Support for Civil Authorities*, (Washington, DC: DOD, February 2013) 1, accessed from <http://www.defense.gov/news/homelanddefensestrategy.pdf>.

¹³³Adolphus W. Greely, "Thank God For Soldiers: The Earthquake in California, Army Special Report" (Washington, DC, U.S. Army, 1906), last updated 10 April 2006 accessed from <http://www.history.army.mil/documents/SFEarthquake/1906Earthquake.htm>.

¹³⁴U.S. Senate, *Hurricane Katrina: A Nation Still Unprepared*, (Washington, DC, GPO, 2006),470–5, accessed from <http://www.gpo.gov/fdsys/pkg/CRPT-109srpt322/pdf/CRPT-109srpt322.pdf>. In the NRF and prior NRP the DOD fought to maintain an assisting agency in the Emergency Support Functions and in legal understandings.

national emergencies and natural disasters. In 10 U.S. Code § 371 through § 382, Congress provided the framework for military assistance to law enforcement when requested for material support and the assistance remained passive.¹³⁵ In the case of natural disaster or national emergencies assistance, laws have strengthened the ability of military assistance within the homeland.

In 1878, the Posse Comitatus Act established a basic legal principle to prevent the usage of the military to enforce laws within the domestic United States. The Posse Comitatus Act was intended to end the post Civil War Reconstruction occupation of former Confederate states. The Act states: “Whoever, except in cases and under circumstances expressly authorized by the Constitution or Act of Congress, willfully uses any part of the Army or the Air Force as a posse comitatus or otherwise to execute the laws,” shall be punished.¹³⁶ Restricting the scope of military involvement domestically, the Posse Comitatus Act drew a distinction between legitimate national security missions and law enforcement. The Posse Comitatus Act solidified a societal constant in the United States, since the framers of the Constitution, to ensure that the military remained subservient to civil authority.¹³⁷ As the principle actor able to exercise the states legitimate use of force, the military could threaten the very state employing it. If allowed to enforce and possibly create or interpret laws, an unrestrained military could present an unelected, armed body capable of exercising power without physical restraint by any government body or law. Threatening democracy, the long-term repercussions could see a military assumption of power and a return to authoritarianism, akin to British colonial rule, or the military employed for political purposes by incumbent officials.

¹³⁵10 U.S. Code §371–382, Cornell University Law School, accessed 13 July 2014 from <http://www.law.cornell.edu/uscode/text/10/subtitle-A/part-I/chapter-18>.

¹³⁶U.S. Congress, *Posse Comitatus Act*, (Washington, DC: GPO, Title 18, U.S. Code Section 1385), accessed 08 June 2014 from <http://www.law.cornell.edu/uscode/text/18/1385>.

¹³⁷Elsea, “Posse Comitatus Sketch,” 1. The Declaration of Independence charged Great Britain with quartering British troops in civilian homes against the will of the colonists. The Articles of Confederation argued for maintaining only a minimum of standing military forces during peacetime. The Constitution solidified civilian control of the military by establishing the President of the United States as the Commander in Chief of the military and Congress with responsibilities to the declaration of war and the ability to establish, maintain, and regulate the military. The Bill of rights limits military quartering in civilian homes.

Posse Comitatus does restrict law enforcement in military operations during natural disaster mitigation and relief efforts. Congress retains the power to provide explicit exceptions, rules, and authorities for the use of the military in specific types of operations, including natural disasters and national emergencies.¹³⁸

1. Advantages

In contrast to the Posse Comitatus Act, the Stafford Act established procedures and circumstances for defense support for civil authorities during a national emergency or natural disaster. Originally the 1974 Disaster Relief Act, the 1988 Stafford Act amended the federal statute and firmed the role of FEMA, in response to significant natural disasters in the late 1980s. The most recent changes to the Stafford Act occurred in 2006 following Hurricane Katrina to better facilitate a whole of government response to national disasters.¹³⁹ The 2006 changes focus on expediting relief and enhanced mitigation efforts prior to an incident. As the primary authority for military assistance in domestic disaster relief, the Stafford Act accepts that “disasters often cause loss of life, human suffering, loss of income, and property loss and damage,” and that the state and local governments are overwhelmed by the severity of disasters.¹⁴⁰

There are three methods to gain federal assistance under the Stafford Act. First with the request and provided evidence of the disasters magnitude by the state governor, the president can declare a “major disaster.” The president may then, without limits, mobilize federal agencies and the “Department of Defense for the purpose of performing on public and private lands any emergency work, which is made necessary by such incident and which is essential for the preservation of life and property.”¹⁴¹ Second, the president may declare an “emergency” with the same request and evidentiary support from the state governor as provided for a major disaster. Emergencies are more limited in

¹³⁸Elsa, “Posse Comitatus Sketch,” 2.

¹³⁹Francis X. McCarthy, “Federal Stafford Act Disaster Assistance: Presidential Declarations, Eligible Activities, and Funding” (Washington, DC: CRS, RL33053, 7 July 2011), 2–4, accessed from <https://www.fas.org/sgp/crs/homsec/RL33053.pdf>.

¹⁴⁰*Stafford Act*, 1.

¹⁴¹*Stafford Act*, 28.

financial assistance and support, equivalent to \$5,000,000.¹⁴² Third, Section 403 of the Stafford Act permits in the “immediate aftermath of an incident which may ultimately qualify for assistance,” the president may, at the state governor’s request, direct the Secretary of Defense to utilize DOD assets “for the preservation of life and property”¹⁴³

Due to the unique nature and ability to fight wildfires, an additional method exists for DOD assistance under the Stafford Act specifically for wildfires. Section 420 of the Stafford Act establishes that the president has the same authority to provide major disasters assistance “for the mitigation, management, and control of any fire on public or private forest land or grassland that threatens such destruction as would constitute a major disaster;” however, the “declaration does not require presidential authorization.”¹⁴⁴ Wildfires, according to the Stafford Act, permit large preventative federal assistance. FEMA provides the majority of their relief assistance through this method. Additionally according to the Office of Management and Budget (OMB), DOD provides assistance specifically for wildfires through two Stafford Act methods. First with FEMA operating in Section 420 of the Stafford Act and at a request from the state governor, FEMA may direct the Secretary of Defense to provide assets essential for the preservation of life and property under Section 403 for 10 days.

Second under Section 420, FEMA coordinates for resources through the NIFC authority to order DOD assets, usually once the fire is contained and weakened and community assistance is required.¹⁴⁵ The DOD has established specific procedures with the NIFC for military assistance. Previously, the DOD had two memorandums of understanding (MOU) in regards to wildfire support. In 1975, the DOD issued a MOU with the Department of Agriculture and the Department of the Interior agreeing to provide wildfire assistance. In 1990, a MOU between DOD and the NIFC amended the

¹⁴²Francis A. Detzampo, Capt., USMC, “Warriors on the Fire Line: The Deployment of Service Members to Fight Fire in the United States,” (Washington, DC: The Army Lawyer, U.S. Army, April 1995), 53, accessed from http://www.loc.gov/rr/frd/Military_Law/pdf/04-1995.pdf.

¹⁴³*Stafford Act*, 28.

¹⁴⁴*Stafford Act*, 48; “A Review of Existing Authorities and Procedures for Using Military Assets in Fighting Wildfires” (Office of Management and Budget, 17 May 2004), 3, accessed from http://www.whitehouse.gov/sites/default/files/omb/legislative/maffs_051704.pdf.

¹⁴⁵“Review Authorities Military Wildfires,” 3–4.

1975 MOU and included the employment of DOD helicopters for wildfire support.¹⁴⁶ Active duty military personnel, equipment, and aircraft have responded to NIFC requests continuously under these MOUs.¹⁴⁷ Superseding the MOUs, a 2006 interagency agreement established the procedures, circumstances, and priorities for DSCA for wildfire support. The NIFC has remained the hub for communications and requests for DOD assistance; a DOD Coordinating Officer embedded at NIFC's NICC communicates between NORTHCOM and the requesting GACCs and Dispatch Centers. Offering only temporary assistance, DOD assets are requested once all civilian contract assets are expended or unavailable.¹⁴⁸ The Assistant Secretary of Defense for Homeland Defense evaluates the DOD commitment and the Secretary of Defense authorizes the deployment of forces.¹⁴⁹

Since 1973, elements of the Air National Guard in a federalized Title 10 status have provided Modular Airborne firefighting Systems (MAFFS) to wildfire managers through the NIFC. MAFFS have contributed over 6,700 missions to deliver in excess of 18.3 million gallons of retardant. Statutory authorization for MAFFS lies in the 1975 and 1990 MOUs, the 2006 interagency agreement, and Economy Act. The Economy Act 31 U.S. Code §1535 authorizes assistance between federal agencies with the understanding the receiving agency will reimburse the providing agency for the goods and services. In addition, the assistance is aimed to supplement contracted services that are unavailable, overwhelmed, or inconvenient.¹⁵⁰ The OMB has confirmed the MAFFS operations are consistent with federal law and are “necessary and appropriate...to minimize the risk to public safety.”¹⁵¹

¹⁴⁶“Review Authorities Military Wildfires,” 5.

¹⁴⁷Detzampo, “Warriors on the Fire Line,” 51–52; “Review Authorities Military Wildfires,” Appendix F.

¹⁴⁸*Interagency Agreement for the Provision of Temporary Support During Wildland Firefighting Operations Among the U.S. Department of the Interior, the U.S. Department of Agriculture, and the U.S. Department of Defense*, 3–5, accessed 12 July 2014 from http://www.firescope.org/specialist-groups/aviation/documents/operational_guidelines/Chapter%203,%20Federal%20Interagency%20Agreements%20Flow%20Charts%20pdf.pdf.

¹⁴⁹“Review Authorities Military Wildfires,” 7.

¹⁵⁰“Review Authorities Military Wildfires,” 3.

¹⁵¹“Review Authorities Military Wildfires,” 1.

Additionally, the active duty military retains the immediate response authority (IRA) to provide DSCA in natural disasters, emergencies, and wildfire management. DOD Directive 3025.18 provides Federal military commanders with the authority to take immediate actions in response to a request from civil authorities “by temporarily employing the resources under their control.”¹⁵² Unless under prior higher guidance, commanders are authorized to take actions they deem necessary to “save lives, prevent human suffering, and mitigate great property damage within the United States.”¹⁵³ The situation must reach the “imminently serious” threshold and must not afford sufficient time to gain higher approval. The IRA will last until other sufficient state, local, or federal assistance arrives; higher authority directs a halt to assistance, or by 72 hours from the initial request. Civilians remain protected from “military power that is regulatory, prescriptive, proscriptive, or compulsory.”¹⁵⁴

2. Disadvantages

The American society acknowledges that the military should have a larger role in national disasters, especially wildfires. Societal forces in the United States accept the military assisting civil authorities in major natural disasters like Hurricane Katrina and Super-storm Sandy. Following Hurricane Katrina, the Federal Lessons Learned included a need for a more “integrated command structure” for DSCA and planning for situations “when it is appropriate for the Department of Defense to lead the federal response.”¹⁵⁵ Broadcast television, military recruitment commercials, and federal reports all display images of DOD members assisting in some disaster relief mission in the homeland, without significant challenges to their appropriateness.¹⁵⁶ The U.S. public has accepted for decades DOD ground and aviation assets fighting wildfires; the aircraft color and crew uniforms at a wildfire are negligible. The incident command system and

¹⁵²*Defense Support of Civil Authorities (DSCA): 3025.18*, (Washington, DC: Department of Defense, 21 September 2012), 4, accessed from <http://www.dtic.mil/whs/directives/corres/pdf/302518p.pdf>.

¹⁵³*Defense Support of Civil Authorities*, 4.

¹⁵⁴*Defense Support of Civil Authorities*, 4; *National Response Framework*, 19.

¹⁵⁵*Katrina Lessons Learned*, 43.

¹⁵⁶*National Response Framework*, cover page.

mobilization plans already incorporate military units. The only change to the wildfire management would lie in who responds; local incident commanders, dispatch centers, GACCs, and the NICC would request all aviation elements from the military, instead of contractors.

Neither the law nor the civilian public possess strong reservations against an increased military role in wildfires; the real bone of contention lies in the historic notions about what constitute U.S. military missions. The existing directives and statutory laws leave significant language to emphasize military prioritization for national security missions.

The DOD *Strategy for Homeland Defense and Defense Support for Civil Authorities* declares that defending the homeland and DSCA are primary missions of the DOD; these missions include DSCA for natural or manmade disasters.¹⁵⁷ The DSCA Strategy includes preparation for rapid response establishing that “arriving late to need is not an option.”¹⁵⁸ The *DSCA Strategy* establishes a significant caveat to over-prioritizing the DOD for domestic missions. Homeland defense and global power projection has priority over DSCA.¹⁵⁹ Force structure and resource commitments must stay oriented to the traditional military missions of fighting and winning the nation’s wars.¹⁶⁰

The National Security Strategy (NSS) and the Quadrennial Defense Review (QDR) echo the predominance of DOD mission focus on national security. The 2010 NSS emphasizes the criticality of “strengthening the military to ensure that it can prevail in today’s wars; to prevent and deter threats...and prepare and defend the United States.”¹⁶¹ The QDR establishes the three pillars for DOD to “protect the homeland,”

¹⁵⁷U.S. Department of Defense, *Strategy Defense Support Civil*, 1.

¹⁵⁸U.S. Department of Defense, *Strategy Defense Support Civil*, 2.

¹⁵⁹U.S. Department of Defense, *Strategy Defense Support Civil*, 3.

¹⁶⁰U.S. Army, “Mission,” U.S. Department of Defense accessed 14 July 2014 from <http://www.army.mil/info/organization/>.

¹⁶¹Office of the President of the United States, *National Security Strategy 2010*, (Washington, DC, GPO, May 2010), 14, http://www.whitehouse.gov/sites/default/files/rss_viewer/national_security_strategy.pdf.

“build security globally,” and “project power and win decisively.”¹⁶² Only a portion of one pillar pertains to DSCA and response to natural disasters. The preponderance of DOD planning, force shaping, and strategic vision remains on national security related operations.

The statutory law and interagency agreements acknowledge the DOD national security mission priority. Title 10 USC § 376 restricts the services and support provided under DSCA to civilian law enforcement “if the provisions of such support will adversely affect the military preparedness of the United States.”¹⁶³ Unlimited during a national disaster, The Stafford Act limits DOD assistance during a designated emergency to only 10 days.¹⁶⁴ The *Interagency Agreement for the Provision of Temporary Support During Wildland Firefighting Operations* and prior MOUs condition that DOD resources are available only after civilian contract assets are “depleted and only when the incident has a bona fide need for additional air resources.”¹⁶⁵

The physical impact of assuming the aviation wildfire support may interfere with the national security missions of the active duty military. In 2006, Hurricane Katrina occupied a significant portion of military forces during a time of war. The military relief response to Hurricane Katrina included 58,000 U.S. Army and National Guard troops, 21 naval ships, 350 helicopters, 75 fixed-wing aircraft, and an additional 300,000 personnel available for assistance.¹⁶⁶ Another major disaster may likely require the same level of response. Without any backup or relief forces for active duty military aircraft and crew in wildfire support, either the wildfire management teams are left without aviation

¹⁶²U.S. Department of Defense, *Quadrennial Defense Review: 2014*, (Washington, DC: DOD, 4 March 2014), V, accessed from http://www.defense.gov/pubs/2014_Quadrennial_Defense_Review.pdf.

¹⁶³ U.S. Congress, *10 U.S. Code § 376 Support Not to Affect Adversely Military Preparations*, accessed 14 July 2014 from <http://www.law.cornell.edu/uscode/text/10/subtitle-A/part-I/chapter-18>.

¹⁶⁴*Stafford Act*. 28.

¹⁶⁵Department of the Interior, *Military Use-Handbook 70–2*, accessed 12 July 2014 from http://www.firescope.org/specialist-groups/aviation/documents/operational_guidelines/Chapter%203,%20Federal%20Interagency%20Agreements%20Flow%20Charts%20pdf.pdf; “Review Authorities Military Wildfires,” 10.

¹⁶⁶Nina Kamp, “Timeline of Military Deployment for Katrina Disaster Relief” (The Brookings Institute), accessed 14 July 2014 from <http://www.brookings.edu/fp/projects/homeland/katrinamilitarydeployments.pdf>.

support or other national emergencies have reduced resources to respond. DOD austerity measures have seen the reduction of forces and equipment, further shrinking the fulfillment of multiple commitments.¹⁶⁷

Beyond the diversion of aircraft and crews, the financial and budgetary impact of wildfire suppression missions places a higher structural wear on vital military aircraft, and these aircraft will experience a shorter service life, as a result.¹⁶⁸ When returned to military operation, the structurally weaker aircraft impose a higher safety risk for the aircrew and vital national security missions. In spite of maintenance support, an aircraft's airframe or load bearing internal framework can only withstand a certain tolerance to massive pressures, vibrations, and other aerodynamic stresses before stress fractures retire the aircraft or result in catastrophic failure. The two fatal airtanker mishaps in 2002 experienced the wings breaking off in flight due to long-term fatigue.¹⁶⁹ The reduced life of military aircraft employed in wildfire support increases the costs to recapitalize the assets and creates long-term escalation of program costs within the DOD budget.

B. FINANCIAL ANALYSIS

The active duty option has several financial benefits over the contract-based system. The primary financial advantage resides in the cost-effective use of resources. The assets, maintenance, and operators come from a different budget, but without changes to the Economy Act reimbursement would still come from the Department of Agriculture and Department of the Interior wildfire management allocations. The active duty military already incorporate equipment and procedures into aviation that the contract system has failed to implement.

1. Advantages

The active duty military option utilizes the immense resources of the U.S. armed forces to maximize efficiencies for wildfire aviation. With a massive logistics,

¹⁶⁷U.S. Department of Defense, *Quadrennial Defense Review: 2014*, 1.

¹⁶⁸"Federal Aerial Firefighting Effectiveness," iii.

¹⁶⁹"Fire Improvements Needed," 2.

acquisitions, manning, training, and budget appropriations network, the military has economy of scale in aviation and aviation support. All five services operate extensive fleets of aircraft from helicopters to massive cargo planes and UAVs. The established military infrastructure provides a ready pool of resources to increase the numbers of aviation assets available for wildfire support while avoiding the overhead costs of recapitalizing vendors' aircraft. The Defense Logistics Agency overcomes the logistical challenges of supplying military forces overseas, and they would efficiently supply aviation assets operating from the homeland in wildfire missions.

Absent in the contract-based system, standardization of procedures and equipment provides another fiscal cost savings. A joint acquisition and commonality in resources reduces maintenance costs and logistical complexity through interoperable aircraft mechanics and parts. Except for the U.S. Army, every service operates a variant of the C-130 cargo aircraft, the same aircraft employed to utilize the MAFFS.¹⁷⁰ As of February 2014, U.S. military operated 636 C-130 aircraft; in comparison, the total large and very large airtanker fleet numbered at 11 aircraft.¹⁷¹ In addition, every service operates a variant of the Sikorsky H-60 Blackhawk helicopter, a medium lift helicopter often employed in wildfire support. Communication systems are criticized in the Hurricane Katrina Lessons Learned as lacking resiliency and interoperability, but communications equipment in the active duty military experience a high degree of standardization, robustness, and commonality, due in part to past failures.¹⁷²

The benefit of separating escalating aviation costs from the Department of the Interior and the Department of Agriculture lies in preserving the integrity of fuel reduction funds. Fuel reduction funds focuses on excess fuel and biomass reduction and removal from fire prone areas, especially in the WUI. Prevented from natural burn removal through aggressive wildfire suppression, the excess biomass and fuels have

¹⁷⁰Timrek Heilsler, "C-130 Hercules: Background, Sustainment, Modernization, Issues for Congress" (Washington, DC: CRS R43618, 24 June 2014) 4–5, accessed from <https://www.hsdl.org/?view&did=755436>.

¹⁷¹Heilsler, "C-130 Hercules," 5; *2014 Federal contract Airtanker List*, (Boise, ID: National Interagency Fire Center, 12 May 2014), accessed 14 July 2014 from http://www.nifc.gov/nicc/logistics/aviation/Federal_Contract_Air_Tanker_List.pdf.

¹⁷²Katrina Lessons Learned," 41.

accumulated increasing the intensity of wildfires. For years the Forest Service and BLM has re-appropriated money from fuel reduction efforts towards the soaring costs of suppression.¹⁷³ The separation of wildfire aviation funding permits the focus of Forest Service and BLM on land management and the reduction of fuels accumulating in high risk areas; removing the growing fuel levels breaks the cycle of more intense wildfires and their massive suppression costs.

Employing the active duty military includes the massive support from DOD research and defense companies. Since the inclusion of aviation in wildfire suppression after World War II, derelict and surplus aircraft have made up the bulk of the wildfire management fleet.¹⁷⁴ In contrast, the DOD is renowned for employing cutting-edge technology and innovations through the defense industry and the Defense Advanced Research Projects Agency (DARPA).¹⁷⁵ The extensive industrial and research base supporting the military continuously develops new tools and equipment.¹⁷⁶ In the wildfire management role, the active duty military will employ many of these capabilities to enhance suppression effectiveness. Night vision devices (NVD), infrared imagery, UAVs, and advanced aircraft systems permit the military to provide aviation support around the clock without sacrificing safety.¹⁷⁷ The extensive military experience in utilizing and coordinating multiple manned and unmanned platforms in confined airspace

¹⁷³Gorte, "Rising Cost Wildfire Protection," 15.

¹⁷⁴California Department of Forestry and Fire Protection, "CDF Aviation Management History" The State of California, 1, accessed 10 May 2014 from http://www.fire.ca.gov/communications/downloads/fact_sheets/Aviation_History.pdf; "Fire Improvements Needed," 1–2.

¹⁷⁵U.S. Department of Defense, "Defense Science Board 2003 Summer Study on DOD Roles and Missions in Homeland Security" (Washington, DC: DOD, May 2014), 87, accessed from <http://www.fas.org/irp/agency/DOD/dsb/homelandv2.pdf>.

¹⁷⁶Jane's Industry Quarterly, "U.S. DOD Budget Program Data FY14" (IHS Inc, posted 07 April 2013), accessed from <https://janes.ihs.com.libproxy.nps.edu/CustomPages/Janes/DisplayPage.aspx?DocType=Reference&ItemId=+++1579632&Pubabbrev=JIQ>. The U.S. DOD Research Development Test and Evaluation budget for 2014 is \$59.5 billion to support current and future programs and equipment.

¹⁷⁷Graham Warwick, "Seeing s Believing" (New York: Aviation Week & Space Technology, 5 January 2009), Abstract, accessed from <http://search.proquest.com.libproxy.nps.edu/saveasdownloadprogress/75E6F3703A20420DPQ/false?accountid=12702>. Raytheon has a \$17.9 million contract to develop an advanced night vision system to better aid military helicopter, night low-level flying, similar to that used during the day against wildfires.

permits a seamless integration of active duty military use of advanced technologies, like UAVs, immediately into the wildfire management missions.¹⁷⁸

For the military takeover of wildfire aviation, the costs have turned in favor of military aircraft. With higher salaries of military aviators and maintenance personnel, MAFFS experienced higher operational costs a decade ago; however, increased maintenance and operations costs have enlarged the contract fees. The 2004 actual costs for employing MAFFS—at \$20,265 a day for two aircraft—was twice as expensive as comparable civilian aircraft at \$10,844 a day for 2 P-3 airtankers.¹⁷⁹ The 2013 actual costs for large airtankers have increased to a peak of \$34,000 exclusive-use contract costs plus between \$4,400 and \$9,996 an hour flight costs.¹⁸⁰ The per flight hour cost of MAFFS in 2012 was \$13,952 and in 2013 \$17,391; the dramatic differences in costs relate to the increased efficiencies from the increased use in 2012.¹⁸¹ The DOD-provided service has become more economical than the contracted vendors.

2. Disadvantages

The 1932 Economy Act governs interagency contracts and would compel the reimbursement to the DOD from the Department of Agriculture and Department of the Interior funds. Under the Economy Act, the requesting agency, the agency obtaining the

¹⁷⁸“Unmanned Aircraft Systems: Use in the National Airspace System and the Role of the Department of Homeland Security” (Washington, DC: GAO, GAO-12-889T, 19 July 2012), 1–4, accessed from <http://homeland.house.gov/sites/homeland.house.gov/files/Testimony-Dillingham.pdf>. UAVs or UASs lack the human eyes to “see and avoid” other aircraft, this creates a hazard in uncontrolled and controlled airspaces mixed with manned aircraft. The military has had extensive operational experience with integration of UAVs with manned aircraft to safely permit both mission completion.

¹⁷⁹“Review Authorities Military Wildfires,” 10; Bill Gabbert, “New Owners of Aero Union’s Assets Intend to Sell or Lease the P-3s” Wildfire Today, posted 20 November 2013 at <http://fireaviation.com/tag/maffs/>. The Forest Service cancelled the P-3 airtanker contract in 2011 due to maintenance and inspection concerns.

¹⁸⁰“Fire Improvements Needed,” 42.

¹⁸¹“USDA Forest Service Communication Products: Topic: Modular Airborne Fire Fighting Systems (MAFFS) Training” (Washington, DC: U.S. Department of Agriculture Forest Service, 27 February 2014), 3–6, accessed 14 July 2014 from http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0CCUQFjAB&url=http%3A%2F%2Fwww.nifc.gov%2FPIO_bb%2FBackground%2FMAFFSTrainingComPlanTemplate.doc&ei=i7nGU9CsGej5iwKwnoAI&usg=AFQjCNFcc0-iU70mxJfy3xsUKWDnAG6_fA&sig2=nSpKCy5GNEt0qxPRx-wo9w&bvm=bv.71126742.d.cGE. The provided hours flown by MAFFS for 2012 and 2013 were 888.7 and 540.5 at a total cost of \$12.4 million and \$9.4 million, respectively. The per flight hour costs average is \$13,952 for 2012 and \$17,391 for 2013.

services, is required to reimburse the actual costs of services provided by the servicing agency.¹⁸² Even in the cases of emergencies, like the letters of agreement between DOD and the NIFC, the services requested must be reimbursed; if the services are provided at the receiving agency's request, they are not free.¹⁸³ The payments credit the fiscal year the services were performed and not the year the payments were made; if made the following year the money goes into the U.S. Treasury.

The DOD has an exception and may utilize the funds into the current year.¹⁸⁴ The reimbursement actual costs must reflect an accurate estimate of costs, including "salaries of employees," equipment costs, and servicing costs; the estimates are forbidden from over or under charging.¹⁸⁵ Title 10 USC § 380 obligates the Secretary of Defense to require reimbursement for services provided to other federal agencies; unless, the services provided benefited the DOD or were in the "in the normal course of military training or operations."¹⁸⁶

C. ORGANIZATIONAL ANALYSIS

The active duty military option outperforms the contracted system in terms of organizational structure and culture. After 9/11 and Hurricane Katrina, the modern active duty force maintains a substantial resource base with established plans and procedures for operations to support DSCA. The well-configured military continues to evolve and incorporate advancements to the vital DSCA mission with lessons learned. The active duty military culture establishes a standardized capability to learn, adapt, and overcome challenges, while maintaining acceptable risk mitigation.

¹⁸²Kate M. Manuel and Brian T. Yeh, "Interagency Contracting: An Overview of Federal Procurement and Appropriations Law" (Washington, DC: GAO, 30 August 2010), 2, accessed from <http://fas.org/sgp/crs/misc/R40814.pdf>.

¹⁸³"Review Authorities Military Wildfires," 8–10.

¹⁸⁴Manuel and Yeh, "Interagency Contracting"9.

¹⁸⁵ Ibid.,10.

¹⁸⁶U.S. Congress,*10 U.S. Code § 377 Reimbursement*, accessed 14 July 2014 from <http://www.law.cornell.edu/uscode/text/10/subtitle-A/part-I/chapter-18>.

1. Advantages

Since the 2002 creation of U.S. Northern Command (NORTHCOM), the military forces in the United States have a central structural organ to coordinate and command military operations within the homeland. NORTHCOM's mission is "to conduct homeland defense and civil support operations within the assigned area of responsibility to defend, protect, and secure the United States and its interests."¹⁸⁷ NORTHCOM is a regional combatant command with an area of responsibility covering all of North America and the maritime and aerial approaches to the continent.¹⁸⁸ The individual service regional component commanders own the forces and provide the resources, upon request, to NORTHCOM's operational control. Recognizing a need for formal coordination, training, and operational unity, NORTHCOM acts to funnel connections between the DOD and civilian public and private entities. Through interagency agreements and partnerships, NORTHCOM has continued to build and solidify relationships between the DOD and federal, state, local, and tribal officials and first responders. NORTHCOM coordinates NIFC requests for forces through the interagency agreement for wildfire assistance and the deployment of MAFFS in federalized Title 32 status.¹⁸⁹ Learning from lessons of Hurricane Katrina, Super-storm Sandy, and exercises, NORTHCOM has sought closer partnerships and interoperability with civilian agencies.¹⁹⁰ The DOD has a permanent, effective and adaptive central command and control structure for DSCA and homeland defense.

The modern active duty military incorporates a significant culture of reform across all branches of the armed forces. Although at times staunchly stuck in tradition, the U.S. military has accepted and embraced substantial reforms and evolutions to military affairs and organization over the last century. The 1947 National Security Act

¹⁸⁷U.S. Department of Defense, "USNORTHCOM Mission" USNORTHCOM, accessed 14 July 2014 from <http://www.northcom.mil/Newsroom/FactSheets/ArticleView/tabid/3999/Article/1891/usnorthcom-vision.aspx>.

¹⁸⁸Knight, "Roles Northern Command," 2.

¹⁸⁹*Interagency Agreement Firefighting*, 5; "Review Authorities Military Wildfires," 8.

¹⁹⁰Knight, "Roles Northern Command," 8. NORTHCOM purchased 22 identical mobile cellular system with FEMA and the National Guard Bureau to ensure coordinated communications during emergencies.

reorganized the military after the close of World War II and established a Joint Chiefs of Staff to lead the services and administrate military operations. The 1986 Goldwater-Nichols Act reformed military operations to increase civilian oversight and standardization of military planning and acquisitions. The military infrastructure thrives on continuous long range strategic planning from Quadrennial Defense Reviews, National Defense Plans, National Security Strategies, and extensive commissions and congressional oversight committees. The transparency of structure and evolutionary nature within the U.S. military forms an adaptable culture.¹⁹¹

A challenge with wildfire aviation is the staffing of trained and experienced crews to operate the aircraft. Professional and aggressive, military aviators press their aircraft to accomplish missions, but they do so with a full understanding of risk mitigation. Ingrained in modern military flight training and culture, risk mitigation fundamentals are continuously taught, honed, and evaluated to assure safe and effective mission accomplishment.¹⁹² What the military may lack in initial wildfire aviation experience they learn, adapt, test, and pass on the corporate knowledge to subsequent generations of aviators through professional analysis and scientific accountability. A cycle developed and tempered through a century of military aviation. The military incorporates tactical and operational evaluations into routine missions to ensure the most effective methods are employed. Unlike the contracted wildfire aviators, the active duty military encourages advancement of procedures through scientific analysis.¹⁹³ In contrast to the contract-based “old boys” culture of risk acceptance and individual experience, professional

¹⁹¹Clark A. Murdock and Michele A. Flournoy, “Beyond Goldwater-Nichols: U.S. Government and Defense Reform for a New Strategic Era, Phase 2 Report” (Washington, DC: Center for Strategic and International Studies, July 2005), 140–143, accessed from http://csis.org/files/media/isis/pubs/bgn_ph2_report.pdf.

¹⁹²U.S. Navy, *Naval Aviation Safety Management System: OPNAV INST 3750.6S*, (Washington, DC, Office of the Chief of Naval Operations, 13 May 2014), 2–3, accessed from <http://doni.daps.dla.mil/Directives/03000%20Naval%20Operations%20and%20Readiness/03-700%20Flight%20and%20Air%20Space%20Support%20Services/3750.6S.pdf>. OPNAV declares that risk mitigation is an all-hands effort and the key lies in risk management through hazard awareness, risk controls, and supervision.

¹⁹³“Fire Improvements Needed,” 15–16. The GAO reported that contractors worried about information collection on the effectiveness of drops due to concerns about the punitive nature of their use by Forest Service officials.

military aviators adapt and manage risk through tested procedures while accomplishing the missions.

2. Disadvantages

The active duty military faces challenges in the organizational takeover of wildfire aviation duties. The initial turnover would gap both defense responsibilities and capable wildfire aviation support missions. In the absence of established procedures, military aviators would maintain caution until a manageable safety margin was attained to maximize both effectiveness of aviation and safety of the aircraft and crews. The few years following the active-duty option could result in very dramatic wildfire outbreaks until the active-duty military adjusted to balancing resources and training for an effective wildfire aviation role.

The existing organization of NORTHCOM hinders an efficient or effective use of the active-duty military. NORTHCOM lacks assigned units. Unlike the other Geographic Area Commands with continuously rotating resources of the various armed services, NORTHCOM only controls a limited amount of staff and assets until an emergency. Wildfires are unpredictable and the seasons are growing in length; it is common for wildfires to start outside of the traditional wildfire seasons in many areas of the United States. NORTHCOM would need the same level of resource commitments to fulfill wildfire aviation mission within the homeland, in order to meet the ever present hazard and fluctuating seasons.

D. STATION FIRE

The active-duty option would have applied substantial improvements to the incident management of the Station Fire. The known quantity of military aviation capabilities would have provided the incident commanders with a standardized resource with expanded capabilities, beyond the contract system. The incident commanders would have focused on the most efficient means to manage the wildfire, instead of fiscal scrutiny of resource costs. With the active duty military, the management effort would have more and better assets to utilize.

1. Advantages

Through consistency and standardization, active duty-military aviation provides a coordinated effort that maximizes resource utility against wildfires, like the Station Fire. In the military option, certain units designated through NORTHCOM and their internal service chains of command are deployed during the regional wildfire seasons with additional units available for surge. Fused together by uniform training and standard operating procedures, these aviation units provide a plug and play consistency with seamless transitions from one unit to the next. Building on the uniformity, military units with sufficient manning can keep high demand resources in the fight longer through swapping in fresh crews; the station fire would have had continuous aviation coverage. Experienced with multitasking and high workloads in the combat environment, the capable military aviators can collect data for effectiveness studies and tactical awareness of the wildfire advance. Wildfire tactics and strategies benefit from scientific analysis of aviation suppression efforts; without proof from objective study, wildfire tactics are simply a tradition. Combined with capable firefighters on the ground, military units would have been aggressive enough to contain the Station Fire during the first day's initial attack, as wildfire suppression doctrine supports.

The active duty military option overcomes the challenges and weaknesses of the original Station Fire incident response. Common and expertly applied across each service, night flying is a standard capability. With every unit safely able to operate at night, the Forest Service would have embraced properly risk managed night flying and maintained suppression efforts around the clock to contain the wildfire. UAVs, an integral part of the modern battlefield, would have maintained continuous real-time awareness of the Station Fire's progression to recognize the containment plan was collapsing the first night. The fierceness of active duty military units complements the Forest Service, BLM, and incident management policies of aggressive initial attacks to keep wildfires small and less costly.

The immediate financial burden and politicized second guessing of wildfire incident management disappears with active duty military aircraft. Incident managers can control costs with military aviation fees remaining constant without additional use or

retainer fees. In contrast, contract fees with exclusive-use, call-when-needed, and increasingly costly flight hour use fees discourage incident commanders from utilizing assets as enthusiastically as possible during an initial attack. Free to make objective decisions about efficient wildfire management tactics, incident commanders can focus their energies on the growing threats of wildfires instead of insulating themselves from post fire inquisition on wasted expenses or missed opportunities. Active duty aviation support breaks the chain of soaring costs and increased threats of wildfires.

2. Disadvantages

The drawbacks to active duty military aviation assets used in wildfire support are the risks to national security. A dwindling force in a time of fiscal austerity leaves very little surplus units and resources available to perform both missions well.¹⁹⁴ During an active fire season, the national wildfire management strategy requires several hundred aircraft.¹⁹⁵ Operating on the principle that national security takes precedence, the military will adequately source the peacetime overseas mission first and have units on rotation in domestic bases. The active duty units remaining in the United States continue to train, refit worn resources, and prepare to redeploy; they are not standing idly by. Tasking several hundred active duty military aircraft and crews to fight wildfires significantly reduces and jeopardizes military priorities for national security, homeland defense, and additional DSCA missions. The existing system permits temporary active duty military assistance for surges; the underfunded and overworked active duty can provide for infrequent support, not complete assumption of wildfire aviation.

¹⁹⁴U.S. Department of Defense, *Quadrennial Defense Review: 2014*, 1.

¹⁹⁵“Fire Improvements Needed,” 9–10.

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IV. NATIONAL GUARD OPTION

The active duty model established a viable option to the contract-based approach, but the National Guard option provides a uniquely American twist to the use of military forces in wildfire aviation. Through the establishment of the National Guard as a distinct state entity with organic authorities separate from the federally controlled military, the United States possesses a secondary military capable of taking over wildfire aviation.

The National Guard alternative would replace the entire contract-based wildfire aviation support with elements of the National Guard Bureau, comprised of the Army National Guard and Air Force National Guard. Working under Federalized Title 10 status, State Title 32 status, or state active duty (SAD), the National Guard Bureau's fixed-wing, rotary wing, and UAV units would assume all the missions of wildfire aviation support from airtanker duties to helicopter lift and surveillance. The scope would include the societal legal implications, financial analysis, and the organizational benefits of the National Guard over the contract-based system.

A. LEGAL/SOCIETAL ANALYSIS

The deployment of the National Guard within the domestic United States has few restrictions on the operational uses. Essential to the National Guard's mission and creation, the homeland employment of the National Guard is specifically regulated by federal and state procedures. The American public view National Guard employment in a dramatically different slant than that of the active duty military.

1. Advantages

The National Guard assumption of the national wildfire aviation mission faces few legal/societal barriers. Unlike their active-duty counterparts, the National Guard operates in both a federal and state capacity that permits circumvention of statutory restrictions on military assets. A substantial amount of legal and procedural doctrine governs the use of National Guard units in DSCA, homeland defense, and emergency responsibilities, like wildfire duties. In general, the American public expects and

demands the use of the National Guard in many natural disasters and emergencies; however, national security and homeland defense mission readiness remains an obstacle to remain a balanced force, if the National Guard assumes the entire aviation wildfire role.

Mandated by the U.S. Constitution, the National Guard has evolved into a unique dual-status operational reserve for the U.S. military. Article 1 Section 8 of the U.S. Constitution permits Congress to,

provide for organizing, arming, and disciplining, the Militia, and for governing such part of them as may be employed in the service of the United States, reserving to the states respectively, the appointment of the officers, and the authority of training the militia according to the discipline prescribed by congress.¹⁹⁶

The federal government of the United States and the individual states retain authorities over the National Guard. Under Title 10 status the federal government with the President of the United States as Commander-in-Chief can nationalize the National Guard for federal duty. The individual governors retain both state active duty status and Title 32 status for their individual states National Guard units. Under SAD status, the state pays the complete bill for the National Guard and retains command through the State Adjutant General to the governor; under Title 32 the federal government pays the bill but the governor retains command.¹⁹⁷

The Posse Comitatus Act fails to impact the National Guard assumption of wildfire aviation due to the nature of wildfire suppression missions and the unique status of the National Guard. Intended to restrict law enforcement by the military, the Posse Comitatus Act does not prohibit military support of natural disasters, national emergencies, and wildfire support. Wildfire suppression and management are not considered law enforcement activities, and therefore those who participate in these

¹⁹⁶*Constitution of the United States: Article 1 Section 8*, accessed 14 July 2014 from http://www.archives.gov/exhibits/charters/constitution_transcript.html.

¹⁹⁷“Defense Management: Actions Needed to Ensure National Guard and Reserve Headquarters Are Sized to be Efficient” (Washington, DC: GAO, 14–71, November 2013), 6–8, accessed from <http://www.gao.gov/assets/660/658978.pdf>. In 2013, the federal government paid \$11.1 billion or about 90 percent of National Guard funding.

actions are not subject to the Posse Comitatus restrictions. In addition, National Guard assets under State Active Duty or Title 32 status remain under the command of their state, not the federal government, and are subject to that states' laws and restrictions on any activities within that state. Under a federalized Title 10 status, National Guard units are restricted by Posse Comitatus like the active duty military.¹⁹⁸

As discussed in the previous chapter, existing statutory law and agreements for active duty DOD apply to the National Guard in national emergencies and disasters when it is operating in a federalized Title 10 status. When the federal government wants to both pay for the use of the National Guard and federally command them, the president may apply a Title 10 status to federally activate the National Guard units. While in Title 10 status, National Guard units are indistinguishable from regular, active duty military. Title 10 status National Guard units fall under the command of the overall DOD and NORTHCOM for DSCA and homeland defense missions; this applies the Stafford Act DOD procedures to these National Guard units. The Stafford Act presidential declaration of national emergencies and disasters, restrict the operations, reimbursements, and command of the Title 10 National Guard units, as if they were active duty. The Stafford Act recognizes the unique hazards of wildfires and authorizes DOD assistance with governor request but not requiring presidential authorization.¹⁹⁹ In assuming wildfire aviation roles, the Title 10 National Guard units parallel the active duty military procedures of Stafford Act Section 403 for presidential authorization after becoming a national emergency and Section 420 before becoming a national emergency or disaster. In addition, Title 10 National Guard units comply with the interagency agreement and MOUs between DOD and The Department of Agriculture and the Department of the Interior through the NIFC.²⁰⁰ National Guard commanders in Title 10 status retain the Immediate Response Authority of active duty military commanders to use their resources for temporary assistance to civil authorities upon request, without having to wait for

¹⁹⁸U.S. Congress, *Posse Comitatus Act*; Elsea, "Posse Comitatus Sketch," 1.

¹⁹⁹FEMA, *The Stafford Act*, 48,; "Review Authorities Military Wildfires," 3.

²⁰⁰*Interagency Agreement Firefighting* , 3–5.

higher authorization.²⁰¹ Title 10 status National Guard units are active duty military and have the same restrictions until returned to the states.

State Active Duty and Title 32 National Guard units retain unique abilities granted from their individual states. Within their own states, National Guard units may exercise their authorities granted through their respective chains of command through the state Adjutant General and the governor.²⁰² A governor has the authority to engage the state's National Guard units in natural disasters, wildfires, or other tasks. In an expression of the state governor's authorities to use their National Guards as they see fit, four states established the Emergency Management Assistance Compact (EMAC) in 1996 and received Congressional approval in P.L 104–321. Now comprising all 50 states, Puerto Rico, Guam, the U.S. Virgin Islands, and Washington, DC, EMAC recognizes states to provide mutual assistance to each other without the authorization of the federal government. Although, the federal government does assist in facilitating mutual aid, financing, and organization of the EMAC managing body.²⁰³ EMAC permits a rapid sharing of National Guard forces between all member states. States have shared National Guard forces through EMAC during Hurricane Katrina, 9/11 attacks, Super-storm Sandy, and in several wildfires.²⁰⁴ EMAC still follows the principles of the Economy Act, paying for agency to agency contracting and assistance, in reimbursement from the requesting state or from FEMA to the assisting state for the services provided.²⁰⁵

²⁰¹*Defense Support of Civil Authorities*, 4,.

²⁰²“National Guard Efficient,”6–8; Crofts, “Shaping The National Guard,”11. The state adjutant general serves the state governor as the state's National Guard military commander when the forces are under state control. They are usually appointed except for Vermont and South Carolina, which elect their Adjutant Generals.

²⁰³National Emergency Management Compact, “General Topic EMAC Frequently Asked Questions” EMAC, accessed on 18 July 2014 from <http://www.emacweb.org/index.php/learnaboutemac/module-positions/general>; Bruce R. Lindsay, “The Emergency Management Assistance Compact (EMAC): An Overview” (Washington, DC: CRS, RL34585, 21 July 2008), 3–6, accessed from http://assets.opencrs.com/rpts/RL34585_20080721.pdf.

²⁰⁴“Emergency Management Assistance Compact: Enhancing EMAC's Collaborative Capacity Should Improve National Disaster Response” (Washington, DC, GAO, 07–854), 1–3, accessed from <http://www.gao.gov/new.items/d07854.pdf>.

²⁰⁵“EMAC's Collaborative Capacity ,” 8–10,; *Public Law 104–321*, (Washington, DC, GPO, 19 October 1996), Article IX, accessed 18 July 2014 from <http://www.gpo.gov/fdsys/pkg/PLAW-104publ321/pdf/PLAW-104publ321.pdf>.

The societal implications of the National Guard assuming the wildfire aviation role are positive. The National Guard through doctrine, advertisements, and practice communicates that a large focus of their existence is for national emergencies, especially natural disasters.²⁰⁶ The National Guard continuously deploys aircraft and ground personnel in natural disasters in State Active Duty, Title 32, and Title 10. Since 1973, the National Guard has operated three quarters of the Modular Airborne Fire Fighting System (MAFFS) aircraft under Title 10, State Active Duty, and Title 32. MAFFS have flown 6700 missions and continue to fly in support of their state and the NIFC through provisions of the Stafford Act, MOUs, and the interagency agreement for temporary support. In the past decade MAFFS have delivered 9.7 million gallons of retardant and flown over 4,561.9 hours in support of wildfires.²⁰⁷ Following the drastic reductions of large airtankers since 2000, the MAFFS have become invaluable and make up nearly half of the large airtankers available for wildfire management in the United States for 2013 and into 2014.²⁰⁸ The continued responsibilities of National Guard in wildfire aviation combine with the lack of public outcry to support an expanded role in wildfire aviation support.

2. Disadvantages

The national security implications of a National Guard assumption of the entire wildfire aviation enterprise are significant. The wildfire aviation role will require dedication of several hundred helicopters, UAVs, large cargo aircraft, and the necessary crews and support personnel for extended durations. The increased resource devotion to training and deploying on wildfire missions threatens to over commit the limited and reducing resources of the National Guard.

²⁰⁶*National Guard Regulation 500/5, Air National Guard Instruction 10-208: Emergency Employment of Army and Other Resources, National Guard Domestic Law Enforcement Support and Mission Assurance Operations*, (Arlington, VA: National Guard Bureau, 18 August 2010), 6, accessed from http://www.ngbpdcc.ngb.army.mil/pubs/500/ngr500_5_angi10_208.pdf; National Guard, "National Guard TV Commercial: 'Flood'" published 15 May 2012, accessed from <https://www.youtube.com/watch?v=t93PhEt7KIA>.

²⁰⁷“Review Authorities Military Wildfires,” 1–4; “Forest Service Communication MAFFS,” 3–6.

²⁰⁸“Forest Service Communication MAFFS,” 10. The 8 MAFFS C-130s compare against the 1 Very Large Airtanker on a CWN contract and 8 additional large airtankers on a contract shared with Canada.

As the active duty military services contract in fiscally tight times, the National Guard can expect to shoulder a larger burden on operational commitments like it had in Afghanistan and Iraq.²⁰⁹ An additional full time commitment of resources for an increasingly dangerous and lengthy wildfire threat obligates National Guard resources to the incident management effort, but the National Guard will have fewer resources available for other national disasters, homeland defense, or national security military operations. In the operational reserve role, the National Guard must remain flexible and reactive to rapidly deploy forces within their states, inside the homeland, or overseas. The additional financial and organizational analysis will help determine the suitability of the National Guard option.

B. FINANCIAL ANALYSIS

The financial benefit of the National Guard option resides in the unique dual status of federal and state command. As a military organization, the National Guard is primarily supplied, trained, equipped, and supported by the federal defense budget and the extensive network of defense and industry enterprises. The burden sharing and flexible roles of the National Guard permit an alleviation of fiscal constraints of the contract-based system for wildfire aviation support, while responsibly controlling costs and efficiencies. The National Guard option poses a tangible benefit for efficient and effective aviation support.

1. Advantages

The National Guard shares the benefits of the active duty military in resources and support. Through federal funding, the National Guard has an immense force of some 350,000 soldiers, 106,000 airmen, in excess of one hundred aircraft squadrons, and

²⁰⁹Thomas Shanker and Helene Cooper, “The Pentagon Plans to Shrink Army to Pre-World War II Level” (New York City, New York Times, 23 February 2014), accessed from <http://www.nytimes.com/2014/02/24/us/politics/pentagon-plans-to-shrink-army-to-pre-world-war-ii-level.html>; “Iraq War Drains Guard of Equipment” (Atlanta, GA: Atlanta Journal Constitution, 08 March 2006), accessed from <http://www.military.com/NewsContent/0,13319,90278,00.html>.

several hundred aircraft.²¹⁰ The economies of scale afforded to bulk defense programs and purchases permit a lower cost and more capable assets. The larger pool of aircraft and personnel permits more aggressive wildfire suppression efforts than with contracted assets. Intended for operational plug and play with active duty forces, National Guard units maintain the same high skill level, technical prowess, and incorporated innovations as their active duty counterparts. National Guard units employ night flying, NVD aided flying, infrared systems, and UAVs in a highly integrated airspace with manned aircraft. UAVs of several National Guard units have and currently do, fly missions along the U.S. borders employing sophisticated sensors to provide real-time information for homeland defense and border security missions cheaper and for longer durations than manned surveillance assets.²¹¹ The cost savings and extended performance of UAVs allows instantaneous tactical-level dissemination of fire behavior, persistent monitoring, readily accessible communications with ground firefighters, and tracking and managing of all forces in and around wildfires. Through access to new technologies from industry and defense laboratories, National Guard units remain on the cutting edge of safety and operational modernization.

The National Guard option shares the costs and burdens of wildfire aviation across several spectrums. The dual status and cost sharing of the National Guard passes the costs of purchasing, maintaining, and operating aircraft between the state and federal budgets.²¹² In addition, the capital expenditures for aircraft, equipment, and crews remain in the hands of the federal and state; they are not transferred in the actual costs reimbursement fees for services from either the state or federal assistance. The Forest Service and BLM benefit with reduced suppression costs; vendors include the costs of new aircraft and equipment into the contract fees to recoup their expenses and often delay

²¹⁰“Air National Guard” Global Security.org, last modified 05 July 2011, accessed from <http://www.globalsecurity.org/military/agency/army/arng.htm>; “Army National Guard” Global Security.org, last modified 05 July 2011, accessed from <http://www.globalsecurity.org/military/agency/army/arng.htm>.

²¹¹Tom Barry, “Drones Over the Homeland: How Politics, Money, and Lack of Oversight Have Sparked Drone Proliferation, and What We can Do” (Washington, DC: Center for International Policy, April 2013), 16, accessed from http://www.ciponline.org/images/uploads/publications/IPR_Drones_over_Homeland_Final.pdf.

²¹²“Iraq War Drains Guard.”

purchasing new equipment.²¹³ In the case of the MAFFS, Congress has authorized \$16 million for two new advanced MAFFS for the National Guard without passing those costs onto the NIFC through increased MAFFS rates.²¹⁴

National Guard dual status permits either the state or the federal government to pay the bills for operating the units. Assets used in State Active Duty or Title 32 for the original states retain the costs for wildfire suppression without the need for reimbursement. The governors of Wyoming, North Carolina, and California may each use their MAFFS in State Active Duty status for wildfire management through rapid state command and control without requiring reimbursement by the Department of the Interior or Department of Agriculture. Through EMAC, states share their National Guard assets, including MAFFS, and reimburse state to state. For Title 10 federalized National Guard assets, the federal government pays for the usage of the aircraft internally or requests reimbursement to the DOD from the requesting federal agencies according to the Economy Act.

A state based National Guard system allows a state to match the funding methods of the only standing state-run forestry and wildfire management aviation force, CALFIRE. States can tailor their National Guard use based off their state's fire risk; low states can maintain little to no dedicated wildfire capabilities. The California Department of Forestry and Fire Protection (CALFIRE) maintain a fleet of 23 aircraft to support nearly year round wildfire operations, with almost a \$1.2 billion annual expenditure.²¹⁵ CALFIRE budget funding comes in diverse methods from the state general fund, federal trust fund, reimbursements, and targeted taxes. All states have access to their own general and federal trust funds, but California's additional methods meet the high demands of a fire prone state. California's Fire Prevention fee targets increased taxes on private habitable structures built in the "State's Responsibility Area" and nets an annual revenue

²¹³"Fire Improvements Needed," 30–32; "Federal Aerial Firefighting Effectiveness," 21–23.

²¹⁴" Forest Service Communication MAFFS," 2.

²¹⁵California, "State 2013–14 Budget: 3540 Department of Forestry and Fire Protection" (Sacramento, CA: California's Governor's Office), accessed on 1 August 2014 from <http://www.ebudget.ca.gov/2013-14/pdf/GovernorsBudget/3000/3540.pdf>; California Department of Forestry and Fire Protection, "Air Program" California State Government, accessed 1 August 2014 from http://calfire.ca.gov/fire_protection/fire_protection_air_program.php.

of \$64 million in 2013.²¹⁶ In addition, CALFIRE fights wildfires for other states and on federal lands, and these entities reimburse California over \$362 million in 2013.²¹⁷ The assistance business helps pay for a quarter of the states wildfire costs. Flexibility in revenue permits states to account for increased risks in the WUI and facilitate increased wildfire resources.

Increased maintenance and operational costs of the contract-based framework have made the National Guard assets even more economical. As noted in the chapter on the active duty option, MAFFS actual costs fluctuate annually based on their use and the operational costs like aviation fuel. MAFFS efficiencies increase with more use; the 2012 cost of \$13,952 per flight hour at 888 hours flown was cheaper than 2013 at \$17,391 per flight hour with 540 hours flown.²¹⁸ The requesting agencies benefit with National Guard assets due to avoiding retention fees like exclusive-use and call-when-needed contracts; for the National Guard, the agencies reimburse only for the costs of the assets employed. The government oversight of actual fees through the Economy Act ensures costs are controlled and legitimate.

2. Disadvantages

Like the active duty military, the National Guard would face increased attrition from the new missions of wildfire aviation. Military planners are cautious and deliberate when committing large aviation resources in an increased tempo of flying. Even with excellent maintenance, aircraft have a limited life cycle before they require an expensive refurbishment or an even more expensive replacement aircraft. The more flight hours, in particular with high stress loaded flying of wildfire aviation, the sooner the life cycle ends for an aircraft.

²¹⁶California, “State 2013–14 Budget”; California State Board of Equalization, “Fire Prevention Fee” California State Government, accessed on 1 August 2014 from http://www.boe.ca.gov/sptaxprog/fire_prev_fee.htm. The Fire Prevention Fee targets habitable structure in highly prone areas and tax roughly \$150 per habitable structure a year.

²¹⁷California, “State 2013–14 Budget.”

²¹⁸“Forest Service Communication MAFFS,” 3–6. The provided hours flown by MAFFS for 2012 and 2013 were 888.7 and 540.5 at a total cost of \$12.4 million and \$9.4 million, respectively. The per flight hour costs average is \$13,952 for 2012 and \$17,391 for 2013.

The National Guard has a limited budget that requires the appropriations of state and federal money. With a shorter life on National Guard aircraft in wildfire duties, the costs of new assets and the upkeep of older aircraft increases. The costs are consolidated in a shortened period of time in proportion to the aircraft's effective lifespan. As a result, defense and National Guard budgets skew resources toward the needy wildfire supporting aviation communities, at the expense of combat supporting aircraft types.

C. ORGANIZATIONAL ANALYSIS

The organizational benefits of National Guard assuming all wildfire aviation reside in the dual status and the ease of employing the professional military assets. The same professional military culture and bureaucratic support accompanies the National Guard as with the active duty military. The National Guard holds several advantages in utilizing or bypassing the federal government for either federal or state assistance.

1. Advantages

The professionally trained, led, and equipped National Guard maintains the level of aggressive risk mitigation as their active duty counterparts. National Guard aviators and maintainers utilize the same doctrine and procedures for effective flight operations as the active duty military, described in the previous chapter. The culture of learning, adapting, and overcoming challenges thrives in the National Guard to ensure the transfer of corporate knowledge to new generations of aviators. Scientific analyses of tactics are utilized in every facet of National Guard aviation and will increase the effectiveness of wildfire suppression methods compared to the contract model of disengaged contractors.²¹⁹ National Guard assets practice like they fight in integrated exercises that incorporate all segments of operations; the National Guard will bring the same professional preparation and training to the full assumption of wildfire management.²²⁰

²¹⁹“Federal Aerial Firefighting Effectiveness,” vii. The current model fails to gather or utilize seasonal information to study and develop capabilities or improvements.

²²⁰Garrett Wymer, “National Guard Prepare for Training Exercises” (Weyers Cave, VA: WHSV, 12 May 2014) accessed from <http://www.wHSV.com/home/headlines/National-Guard-Prepares-for-Training-Exercises-258979081.html>; National Guard, “Joint Doctrine, Training, and Force Development (J-7): Major Functions” accessed 18 July 2014 from <http://www.nationalguard.mil/Leadership/JointStaff/J7.aspx>.

Though a dual status, the National Guard applies advantages and operational benefits from both state and federal service. In a federalized Title 10 status, the National Guard functions like the active duty military; they are assigned from their various service chains of command to NORTHCOM for DSCA in national emergencies or disasters. Per the Stafford Act, the federalized National Guard remain under the NORTHCOM operational control or are assigned to assist civil authorities or other requesting federal agencies, like NIFC and the Department of the Interior. In Title 32 or State Active Duty, the National Guard remains under the direct command of their state governor through the state Adjutant General; each governor can direct the units as necessary for wildfire operations or natural disasters within their own states.²²¹ The state-control method permits rapid activation of assets and the flexibility for units to surge in high demand wildfire conditions. The EMAC permits the rapid state-to-state sharing of Title 32 or State Active Duty status National Guard assets. States can bypass the Stafford Act and Posse Comitatus Act restrictions to share National Guard resources to confront emergencies or natural disasters, like wildfires. As a result of the confusion during the Hurricane Katrina response, changes in regulations allow for a “dual-status” National Guard commander to command both Title 32 units and Title 10 active duty military forces; this adaptation permits seamless command and control of all forces operating within the homeland.²²²

2. Disadvantages

The National Guard organization requires the states to both pool resources and individually hoard them. In an infrequent national emergency, states willingly share their resources through EMAC or the federal government federalizes various National Guard units into Title 10 to assist the afflicted states. Without a persistent need in every state for

²²¹*National Guard Regulation Domestic* , 7–8;

²²²*National Guard Regulation Domestic* , 7–8; Dan Elliott, “DOD Grooms Commanders for Disaster Response” (The Army Times, The Associated Press, 3 July 2011), accessed from <http://www.armytimes.com/article/20110703/NEWS/107030307/DOD-grooms-commanders-disaster-response>; *Katrina Lessons Learned*, 43. The Katrina Lessons Learned discussed the problems (waste, de-confliction, and communication) during the response with command and control of National Guard Title 32 and SAD forces operating under different chains of command than the Title 10 forces. The resulting dual status officers are intended to allow unique federal/state officers to operate with two simultaneous chains of command to lead forces of all statuses.

their National Guard units to perform intra-state services, the state fails to notice the absence of the National Guard forces.

If wildfires continue to become common hazards for an increasing number of traditionally low-threat states, the pool of states willing to share would decrease. National Guard units capable of performing wildfire duties would be in such peak demand that at risk states would reserve their use to protect that state's communities before helping the communities in other states. A limited commodity with an increased demand would, in turn, raise the price for their services.

D. STATION FIRE

Had the National Guard option been in place at the time of the Station Fire, the combined attributes of the National Guard would have resolved the challenges differently. The professional military training and culture of the National Guard would have provided a contrast to the dispassionate contract-based assets of the Forest Service. With a dedicated mission and responsibility to wildfire management, the National Guard would have created advancements in wildfire management tactics, strategies, and firefighting resources to bear against the Station Fire.

1. Advantages

The National Guard option would have altered the Station Fire results through a more effective, aggressive, and efficient aviation model. Like the active duty military, the professional standardization of the National Guard would have provided the incident commanders with capable resources able to actively, contribute both in physical suppression and to the tactical containment strategy. The flexibility of National Guard dual status units would have reduced the fiscal oversight on the incident commander and fostered the aggressive initial attack the Forest Service and BLM advocate.

The National Guard option provides a professionally aggressive force that corrects the shortcomings of the Station Fire incident management. Based off the described National Guard capabilities to fly and fight safely and effectively at night, the National Guard option would have altered the Forest Service resistance to night

operations.²²³ The reversal on the night fighting policy would have sustained the aggressive helicopter and airtanker suppression and contained the wildfire the first night.²²⁴ The integrated UAV resources of the National Guard would have provided a continuous multi-spectral view of the Station Fire to coordinate containment in the small “green island.”²²⁵ The advanced situational awareness would have provided sufficient warning that the Station Fire had a gap in the fire line barrier on the first night. That gap in the barriers permitted the wildfire to cross the highway and expand beyond the initial attack containment.²²⁶ In addition to their advanced capabilities, the National Guard aviators would actively engage with the incident commander and the aviation coordinator, as takes place in military operations, to improve tactical progression of the mission, unlike the passive contracted crews.²²⁷

Through multiple statuses and payment options, the National Guard assumption of wildfire aviation support would have provided more resources without burdening the incident commander with cost minimization. Critics charged that the incident commanders were overly concerned about containing costs and failed to aggressively employ the available resources to sufficiently contain the Station Fire during the initial attack.²²⁸ The National Guard option helps reduce soaring suppression costs and lower

²²³Steve Scauzillo, “Decision to Not Use Nighttime Helicopter Water Drops on Williams Fire Criticized” (Los Angeles, San Gabriel Valley Tribune, 09 August 2012), accessed from <http://www.sgvtribune.com/general-news/20120909/decision-to-not-use-nighttime-helicopter-water-drops-on-williams-fire-criticized>. The Forest Service reversed their decision to allow night flying in 2012, but only for L.A. County Fire Department aircraft and crews. The change came after significant press and political investigations claiming the policies were unwarranted for well trained crews and night capable aircraft.

²²⁴“Station Fire,” 27–28. The Forest Service incident manager failed to utilize the available night flying capable helicopters for suppression duties during the night due to Forest Service conclusions that, “the risks of flying at night outweigh the benefits.” Subsequently, the fire escaped containment in one area and spread out of control.

²²⁵“Station Fire,” 14. The “green island” was a one-quarter acre area of unburned fuel that burned through the first night allowing expansion across a highway and beyond the containment barriers.

²²⁶“Station Fire,” 14–15.

²²⁷“Federal Aerial Firefighting Effectiveness,” vii. The contract based system discourages aviator input and fails to facilitate the crews as active members in developing the tactical strategies.

²²⁸ “Station Fire,” 37–38; Pringle, “Station Fire Cost-Cutting.” A memorandum from the Forest Service regional office advised incident commanders of a budgetary shortfall and to reduce costs by using internal forces before using contract, state, or local assets. Incident commanders told the GAO that this memo influenced their asset requests and strategies.

the inquisition of incident commanders. The MAFFS program already assumes a substantial portion of the large airtanker role, at a reduced cost compared to the soaring contract costs.²²⁹ The ability of State Active Duty National Guard forces to fight wildfires on the state's budget alleviates fiscal concerns of reimbursements from incident commanders who might restrain aggressively necessary strategies.²³⁰ States can tailor their tax codes and National Guard units to gain revenue to pay for wildfire aviation programs, like CALFIRE.²³¹ Utilizing the dual status, the National Guard combines a standing force of Title 32 or Title 10 status units with surge capable State Active Duty forces. With a fully inclusive compact, the EMAC facilitate state to state sharing of National Guard forces for a state financed reserve of wildfire assets for all wildfires. National Guard aviation permits capable use of assets through a proactive burden sharing of aviation costs between the federal and state governments, who would pay the costs of uncontained large fires anyways. As Title 10 National Guard assets fight wildfires for the NIFC, governors are incentivized to share the costs of wildfire suppression in their states.

2. Disadvantages

The national security piece places a great deal less emphasis on the National Guard than on the active duty military. Civilians and politicians expect a homeland oriented National Guard. Commitments to wildfire aviation detract some from the national security mission and require long-term dedication of resources for one specific national security mission. The National Guard will have that many fewer resources able to react to the next national disaster, homeland defense mission, or military conflict overseas.

²²⁹“ Forest Service Communication MAFFS,” 10.

²³⁰ *National Cohesive Fire Strategy*, 4,. The Department of the Interior and the Department of Agriculture endorse that a “safe aggressive initial attack is often the best suppression strategy to keep unwanted wildfires small and costs down.”

²³¹California, “State 2013–14 Budget, 5-8, accessed on 1 August 2014 from <http://www.ebudget.ca.gov/2013–14/pdf/GovernorsBudget/3000/3540.pdf>.

E. CONCLUSION

The National Guard option remains a highly flexible and robust option to replace the contract-based system. With the best of both worlds, the National Guard maintains the professionalism and capabilities of the active duty military but without the immediate national security sacrifice for DSCA missions. As an operational reserve, the National Guard maintains a significant responsibility for homeland defense and national security missions; however, the back-up role permits an assumption of other duties without risking immediate national security. The American people already expect the National Guard to carry out disaster responses, and assuming the entire aviation wildfire mission is an extension of existing programs, like MAFFS. The National Guard option is an efficient and effective method to bolster the capabilities of wildfire management.

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V. NEW DHS FIRE GUARD AGENCY OPTION

A final option is to establish a new United States Fire Guard (USFG) to take over all aviation missions of wildfire management. The USFG would follow the U.S. Coast Guard (USCG) model as an armed service, under the Department of Homeland Security, with specific missions and capabilities defined by Congress. With military and civilian power, the USFG model described in this chapter capitalizes on the benefits of the DOD without the distractions of a national security mission. Working within the DHS, the USFG could fulfill DHS commitments to mitigation and response in the wildfire portions of all hazards, while retaining an exclusive budget and focus devoted to aviation wildfire support.

The establishment of the USFG would alleviate the burden of aviation wildfire support from the DOD and National Guard. With proper funding and resourcing, the USFG would take over all of the aviation roles of wildfire management and drastically reduce the employment of National Guard and active duty units in wildfire missions. A decrease in wildfire distractions would permit the active duty to remain keenly focused for national security and homeland defense missions. In the absence of wildfire support missions, National Guard forces would be more capable of functioning as an operational reserve for the contracting active duty military and to respond the host of other national disasters and emergencies. Without the additional wear and fatigue from wildfire missions, National Guard and active duty military aircraft maintain longer service lives and reduce long range recapitalization costs in the DOD budgets. National Guard and active duty units would only remain in a substantially less used reserve.

This chapter begins by examining the legal and societal implications of the establishment of a new USFG service. It next evaluates the fiscal requirements to stand-up and sustain a USFG; followed by, an organizational analysis of a USFG compared to the existing contract-based approach. Finally, the chapter concludes with an application of how a USFG would have altered the scenario of the Station Fire.

A. LEGAL/SOCIETAL ANALYSIS

The Department of Homeland Security utilizes doctrine that advocates the five mission areas for an all hazards response, but DHS lacks significant capabilities for the persistent and growing threat of wildfires.²³² Homeland Security Presidential Directive (HSPD) 8 establishes the need for an “all hazards preparedness goal, establishing mechanisms for improved delivery of federal preparedness assistance to state and local governments.”²³³ Presidential Policy Directive (PPD) 8 focuses the executive departments to focus the national preparedness goal on the five mission areas of prevent, protect, mitigate, respond, and recover.²³⁴ The National Response Framework defines the mission areas and establishes responsibilities.²³⁵ FEMA contributes to the prevention and recovery portions of all hazards with specific federal grants, rebuilding costs, and relief supplies and resources.²³⁶ In the category of wildfires, DHS lacks a substantial force to influence the mitigation and response mission areas; a new DHS agency dedicated to aviation wildfire support provides DHS with that mitigation and response area.

The brand new U.S. Fire Guard would parallel the legal establishment and organizational model of the Coast Guard. Congress enacted and amended several times U.S. Code to reflect the changing nature of the Coast Guard from the Revenue Cutter Service within the Department of the Treasury to the modern Coast Guard within DHS. Title 14 of the U.S. Code specifically establishes the organization, missions, capabilities, and many other vital attributes of the Coast Guard. Title 14 USC § 1 establishes the Coast

²³²*National Response Framework*, 1. The NRF establishes immediately the five mission areas: Preventions, Protection, Mitigation, Response, and Recovery.

²³³The President of the United States, *Homeland Security Presidential Directive 8: National Preparedness*, (Washington, DC, GPO, 17 December 2003), accessed from <http://www.gpo.gov/fdsys/pkg/CPRT-110HPRT39618/pdf/CPRT-110HPRT39618.pdf>.

²³⁴The President of the United States, *Presidential Policy Directive 8: National Preparedness*, (Washington, DC: Federation of American Scientists, 30 March 2011), accessed from <http://fas.org/irp/offdocs/ppd/ppd-8.pdf>.

²³⁵*National Response Framework*, 1.

²³⁶U.S. Fire Administration, “Grants & Funding Alternatives” FEMA, last updated 23 April 2014, accessed from http://www.usfa.fema.gov/fireservice/grants_funding/; “Oregon Wildfire Receives FEMA Funding” (Washington, DC: FEMA, Released Number 13–6, 20 July 2013), accessed from <http://www.fema.gov/news-release/2013/07/20/oregon-wildfire-receives-fema-funding>. FEMA has several grants to provide recovery, prevention, and additional firefighting units to local communities. In 2013, FEMA used federal funds to pay approximately 75 percent of Oregon’s wildfire firefighting costs.

Guard as, “a military service and branch of the armed forces of the United States at all times.”²³⁷ Title 14 USC § 2 creates the duties of the Coast Guard to enforce federal laws, maintain aids to navigation, and “maintain a state of readiness to function as a specialized service in the Navy in the time of war.”²³⁸ Title 14 USC § 3 places the Coast Guard within DHS unless the president directs them into the navy through executive order or Congress through a declaration of war.²³⁹

If established, Congress would codify the USFG along the Coast Guard model with Title 56.²⁴⁰ The USFG would serve as a military service and operate under DHS. In contrast to the Coast Guard, the USFG would lack the law enforcement powers, but congress would explicitly authorize USFG duties on wildfire management aviation missions and reimbursement procedures. In times of war, the president or Congress may transfer the USFG to the National Guard, instead of the Coast Guard to the Navy. Like the Coast Guard, the USFG would have access to all military schools for instruction, “including aviation school.”²⁴¹ The USFG would supply resources to requesting federal agencies or civil authorities for the purpose of wildfire aviation and the conditions of reimbursement.²⁴² In addition, the USFG would have access to DOD acquisition officials and contract managers for USFG acquisitions.²⁴³

1. Advantages

As an armed service, several statutory laws would apply to the USFG. The 1878 Posse Comitatus Act would limit the USFG’s employment in domestic law enforcement;

²³⁷*Title 14 U.S. Code § 1 - Establishment of Coast Guard*, accessed 20 July 2014 from <http://www.law.cornell.edu/uscode/text/14>.

²³⁸*Title 14 U.S. Code § 2-Primary Duties*, accessed 20 July 2014 from <http://www.law.cornell.edu/uscode/text/14>.

²³⁹*Title 14 U.S. Code § 3-Department in Which the Coast Guard Operates*, accessed 20 July 2014 from <http://www.law.cornell.edu/uscode/text/14>.

²⁴⁰Title 56 is the next available title in U.S. code following four proposed titles not yet enacted.

²⁴¹*Title 14 U.S. Code § 145-Navy Department*, accessed 20 July 2014 from <http://www.law.cornell.edu/uscode/text/14>.

²⁴²*Title 14 U.S. Code § 141-Cooperation With Other Agencies, States, Territories, and Political Subdivisions*, accessed 20 July 2014 from <http://www.law.cornell.edu/uscode/text/14>.

²⁴³*Title 14 U.S. Code § 566-Department of Defense Consultation*, accessed 20 July 2014 from <http://www.law.cornell.edu/uscode/text/14>.

however, wildfire aviation support falls short of any standard as law enforcement.²⁴⁴ The Stafford Act applies the procedures and limitations of assistance for certain DSCA on the USFG in presidential declarations of emergencies, major disasters, and the use immediately following incidents that would qualify as either emergencies or major disasters.²⁴⁵ The persistent threat and uniqueness of wildfires convinced congress to place exceptions for wildfire assistance in the Stafford Act.²⁴⁶

In addition to the explicit Congressional authorization for wildfire aviation support in Title 56, the USFG may participate in wildfire management under Section 420 of the Stafford Act, 42 USC §5187, authorizing the president to supply resources and personnel for wildfire management on public or private lands.²⁴⁷ The Economy Act, 31 USC §1535, places requirements for reimbursement of actual costs from federal agencies and state governments requesting assistance; however Title 56 will explicitly eliminate those fees rendered under standard wildfire management duties within the United States.²⁴⁸

In contrast to the clear congressional Title 56 authorization and the statutory law, the USFG lacks grounds for wildfire support akin to the Title 10 DOD resources. The MOUs and interagency agreements fall short of applying to the USFG while operating in Title 56 instead of Title 10, as during a war. The agreements and MOUs are between the Title 10 DOD resources and the Department of Agriculture and Department of the interior.²⁴⁹ The same applies for the IRA; exclusive to Title 10 forces, the IRA permits immediate and temporary assistance from local DOD Title 10 unit commanders with a request from civil authorizes.²⁵⁰

²⁴⁴U.S. Congress, *Posse Comitatus Act*.

²⁴⁵FEMA, *The Stafford Act*, 2.

²⁴⁶FEMA, *The Stafford Act*, 48.

²⁴⁷FEMA, *The Stafford Act*; “Review Authorities Military Wildfires,” 3–4.

²⁴⁸Manuel and Yeh, “Interagency Contracting,” 2.

²⁴⁹*Interagency Agreement Firefighting*, 3–5. The MOUs and interagency agreements fail to apply to the USCG operating in Title 14 and state National Guard units operating in Title 32. The same application is made to the USFG while in Title 56.

²⁵⁰*Defense Support of Civil Authorities*, 4.

2. Disadvantages

The United State public would have a mixed reaction to the creation of the USFG. Certain experts still debate the necessity of the DHS, the absorption of so many other agencies in 2002, and the focus on terrorism. The political outrage from political organizations against any increases to the federal government would focus on the increased bureaucracy and federal spending for the USFG.²⁵¹ Beyond political grandstanding, the USFG would raise internal concerns.

The DHS Office of Inspector General observed that “DHS’s prevention and preparedness for terrorism have overshadowed that for natural hazards, both perception and application.”²⁵² The USFG would establish the DHS commitment to the all-hazard mantra beyond writing checks. The American people recognize the threat wildfires pose through seasonal news broadcasts and that someone must actively fight to manage the hazards. In the absence of public outrage against the Forest Service and BLM efforts to manage incidents of wildfire, the public would present a similar apathy or even positive encouragement for the USFG.

Very little political momentum exists for reform without a major focusing event. In a time of fiscal austerity, the federal government has very little patience for an expensive, major overhaul of the wildfire aviation system, even if the new option reduces long-term costs.²⁵³ With historically significant wildfire seasons occurring in the past few

²⁵¹The Libertarian Party, “Introduction” accessed 21 July 2014 from <http://www.lp.org/introduction/what-is-the-libertarian-party>. Libertarians uphold small government and decentralized solutions away from the federal government.

²⁵²Department of Homeland Security Office of Inspector General, “A Performance Review of FEMA’s Disaster Management Activities in Response to Hurricane Katrina” (Washington, DC: DHS, OIG-06-32, March 2006), 2, accessed from http://www.oig.dhs.gov/assets/Mgmt/OIG_06-32_Mar06.pdf.

²⁵³Stephen Dinan and Tom Howell Jr., “Lots of Talk, Little Action on Debt Deal in Congress” (Washington, DC: The Washington Times, 13 October 2013), accessed from <http://www.washingtontimes.com/news/2013/oct/13/lots-of-talk-little-action-on-debt-deal-in-congres/?page=all>. The sitting congress has formed little consensus and even less action on vital national topics like debt limits, immigration reform, decaying infrastructure, and a host of other major topics. So much so the federal government shut down for several weeks waiting to pass the 2014 federal budget.

years, the federal government has ceased to perform much overhaul or reform, beyond a bandage of several transferred aircraft.²⁵⁴

B. FINANCIAL ANALYSIS

The USFG approach creates a new organization with costly startup, but long term savings. Unlike the creation of DHS, the majority of the USFG personnel would be new hires and not transferred along with an existing agency under DHS. The aircraft would require startup funds to buy or transfer existing military or civilian agencies aircraft. Fiscally tight, the federal government must see the long term savings of the USFG.

1. Advantages

The USFG option would offer a more fiscally responsible option to the contract-based system now employed for aviation wildfire support. With access to the vast DOD resources and expertise, the USFG could maximize the economies of scale for capital assets and sustainment of resources. The USFG would represent a public based model that employs the advantages of the military and civilian federal agencies in acquisition, training, sustaining, and administration. Compared to the contracted system, the USFG would save the government money and resources, in the long run.

The creation of a USFG requires a significant initial capitalization to reach an effective level of response. Unlike the 2002 creation of DHS, the USFG would require a fully new organization with new resources, personnel, and organization. The federal government funding must reflect the stand-up costs to recruit personnel, to acquire assets, and to establish an administrative structure. The total initial DHS allocation in 2003 was \$29.3 billion transferred along with the 22 already established agencies and their several

²⁵⁴Bill Gabbert, “Forest Service to Enlist Help of Coast Guard to Manage C-130 Airtankers” Fire Aviation.com, posted 14 January 2014, accessed from <http://fireaviation.com/2014/01/14/forest-service-to-enlist-help-of-coast-guard-to-manage-c-130-airtankers/>. The Coast Guard is transferring seven C-130H transport planes to the Forest Service, and the Army is transferring 15 small transport planes for smokejumpers, as well.

tens of thousands of personnel.²⁵⁵ In comparison to the DHS formation, the USFG would need a great deal less than DHS, given a smaller end-force size. As completely new federal allocations, the USFG initial funds would face more obstacles in Congress. Although once established, the USFG funding would replace the costs of contract system aviation costs, reported at \$2.4 billion between 2007 and 2012.²⁵⁶

The USFG would have several options to acquire aircraft for the wildfire aviation support missions. With congressional authorization and prioritization, the USFG could request the transfer of other agency's unneeded assets, buy new aircraft along with other agencies' orders, or buy newly designed aircraft with the DOD design and contracting help.

First, the USFG could request aircraft through intergovernmental transfers of assets. The U.S. Coast Guard and the U.S. Army are currently transferring seven C-130H cargo aircraft and 15 C-23B light cargo aircraft to the Forest Service for wildfire suppression and smokejumper duties through this method.²⁵⁷ The aircraft are provided to the Forest Service without reimbursement and with a \$130 million conversion price tag borne by the DOD for wildfire suppression system for the C-130Hs.²⁵⁸ The transfer method provides adequate aircraft while avoiding the significant start-up capital for purchase of new aircraft.

²⁵⁵Department of Homeland Security, "Creation of the Department of Homeland Security" DHS last updated 22 October 2012, accessed from <http://www.dhs.gov/creation-department-homeland-security>; Harold C. Relyea, "Homeland Security: Department Organization and Management-Implementation Phase" (Washington, DC: CRS, RL31751, 3 January 2005), 7–8, accessed from <http://fas.org/sgp/crs/RL31751.pdf>. DHS was created in 2002 with the inclusion of 22 different federal agencies and their original budgets of about \$35.5 billion in requested funds; the final allocation was \$29.3 billion.

²⁵⁶"Fire Improvements Needed," 3.

²⁵⁷U.S. Forest Service "U.S. Forest Service Offers Preview of C-130H Airtankers" U.S. Department of Agriculture, accessed 04 May 2014 from <http://www.fs.fed.us/fire/aviation/paintscheme.pdf>.

²⁵⁸U.S. Congress, *National Defense Authorization Act for Fiscal Year 2014: Public Law 113–66*, (Washington, DC, GPO, December 2013), Sec 1098, accessed from <http://www.gpo.gov/fdsys/pkg/CPRT-113HPRT86280/pdf/CPRT-113HPRT86280.pdf>; Bill Gabbert: "Defense Bill Passes, Clearing Way for C-130H Transfers to the USFS" posted 20 December 2013 at <http://fireaviation.com/2013/12/20/defense-bill-passes-clearing-way-for-c-130h-transfers-to-the-usfs/>.

Second, the USFG could collaborate with the other armed services for joint acquisition of brand new aircraft and convert them to wildfire roles. Under 14 U.S. Code § 566, the Coast Guard may join with existing DOD contracts for the purchase of new assets, “to obtain the best possible price assets acquired.”²⁵⁹ As an armed service, the USFG could join DOD acquisitions programs for new aircraft. From the order of the most modern C-130J model aircraft, a new C-130 costs \$73 million a copy.²⁶⁰ The add-on method provides a bulk purchase cheaper per unit price for the USFG.

Third, the USFG could use DOD assistance to contract purpose built wildfire aircraft. The U.S. Coast Guard employs the 14 U.S. Code § 566 for contracting and development assistance with DOD contractors to design and build a tailor-made aircraft for specific purposes.²⁶¹ The USFG may use a similar clause to design and build aircraft more capable for wildfire suppression or other missions, than military cargo aircraft. Utilizing the technical and acquisitions expertise of the DOD, the USFG could build a fleet of wildfire specific aircraft without developing a separate research and development apparatus.

The methods chosen to build the USFG will reflect the maturity of the agency. Initially with funds devoted to startup costs, the USFG would avoid major expenditures by utilizing the transfer method to populate the initial capabilities. As the service solidifies, the USFG would replace or expand the aircraft fleet through partnering with existing DOD programs or developing new aircraft programs.

Following the capabilities of the U.S. Coast Guard, the USFG may continue to lean upon the DOD for personnel and for training. The provisions of 14 U.S. Code § 145 order the Secretary of the Navy with or without reimbursement to “receive members of the Coast Guard for instruction in any school, including aviation school maintained by

²⁵⁹U.S. Congress, *14 U.S. Code §566 Department of Defense Consultation*, accessed 04 May 2014 from <http://www.law.cornell.edu/uscode/text/14>.

²⁶⁰Heilsler, “C-130 Hercules,” 11. The multi-year order of 79 aircraft costs \$5.8 billion, and so the per aircraft costs \$73million.

²⁶¹U.S. Congress, *14 U.S. Code §566 Department of Defense Consultation*, accessed 04 May 2014 from <http://www.law.cornell.edu/uscode/text/14>.

the Navy.”²⁶² The USFG would follow similar guidance to permit the use of DOD flight schools for the training of new aviators. In addition, military aviators may perform an inter-service transfer from their DOD service into the USFG to permit increased experience in the USFG. Creating a qualified and capable aviator takes time, the USFG could compensate for the delay in new aviators by filling openings with inter-service transfers until the training pipeline sources reach capacity. A downsizing DOD provides a ready pool of experienced professionals able to fly the newly acquired or transferred aircraft for the USFG. Through transfers and DOD schools, the USFG could avoid the overhead of developing a unique aviation training pipeline and start-up the training delays.

With similar operational expenses, the operational cost of the USFG services would be comparable to the MAFFS. Initially with C-130s and other military cargo aircraft, training aircraft, UAVs, and helicopters, the USFG would operate the same aircraft with some additional wildfire specific modifications. The crew makeup, maintenance requirements, and operational demands would parallel each other. The separation would occur in the dedicated and continued use of the USFG aircraft. Instead of the call-when-needed style of the National Guard MAFFS changing from combat cargo to wildfire operations, the USFG would remain focused, deployed, and ready year round. The MAFFS costs per flight hour generally illustrate that the more hours flown and missions completed the more cost effective the program is per flight hour, as shown in Table 1.²⁶³

²⁶²U.S. Congress, *14 U.S. Code §145 Navy Department*, accessed 04 May 2014 from <http://www.law.cornell.edu/uscode/text/14>.

²⁶³“ Forest Service Communication MAFFS,” 3–6. The provided hours flown by MAFFS for 2011, 2012 and 2013 were 479.7, 888.7, and 540.5 at a total cost of \$9.3million, \$12.4 million, and \$9.4 million, respectively. The per flight hour costs average is \$19,387 for 2011, \$13,952 for 2012, and \$17,391 for 2013.

Year	Gallons Deployed	Hours Flown	Annual Cost	Cost Per Flight Hour
2013	1,400,000	540.5	\$9,400,000	\$17,391
2012	2,400,000	888.7	\$12,400,000	\$13,952
2011	1,200,000	479.7	\$9,300,000	\$19,387
2010	12,000	7.7	\$3,400,000	\$441,558
2009	0	0	\$3,500,000	\$3,500,000
2008	1,300,000	970.10	\$16,100,000	\$16,596
2007	200,000	103.4	\$1,800,000	\$17,408
2006	1,500,000	826.6	\$9,400,000	\$11,371

Table 1. MAFFS information provided from the U.S. Forest Service.²⁶⁴

The costs for USFG suppression and wildfire management missions would come from specific congressional budget allocations. The Economy Act guides the categorization of the actual costs and places restrictions on interagency contracting; however, Title 56, establishing the USFG, would make the service exempt from requesting reimbursement made specifically for wildfire management missions within the United States. Specific allocations within the USFG annual budget requests would fund the aviation wildfire support budget for the year. By separating the wildfire aviation costs from other wildfire management costs, the USFG would establish a separate but accountable agency to plan, to anticipate, and to supplementary fund for especially demanding wildfire seasons. The Forestry Service and BLM could maintain the ground suppression costs without added fiscal concerns of aviation costs. To combat soaring aviation contract costs, the United States needs a single agency responsible to anticipate the demand and manage the cost-effective execution of requests, through a government owned and operated framework.

2. Disadvantages

During fiscally difficult periods, the United States would reduce other necessary programs to pay for the USFG. Congress would consider the USFG budget within the DHS budget and USFG training and research programs against the DOD budget. The

²⁶⁴“ Forest Service Communication MAFFS,” 3–6.

resulting increases to both budgets for the USFG may draw comparable reductions in vital national security, homeland defense, and homeland security missions.

Diminishing the fear, the USFG should result in an overall federal budget savings with reduced wildfire management costs in the Department of the Interior and the Department of Agriculture. The recouped funds could apply to the DOD and DHS budgets to offset the increased financial burden sharing for wildfires.

C. ORGANIZATIONAL ANALYSIS

The USFG organizational framework will mirror the Coast Guard model. The USFG would have organizational advantages stemming from membership in the armed services with access to DOD training and operational culture. With bureaucratic authority from DHS, the USFG could contribute to the incident management planning and tactics, instead of passive participation. The explicit construction of the USFG in Title 56 would permit seamless contributions to federal, state, local, and tribal authorities to facilitate existing wildfire management strategies.

1. Advantages

The armed services would provide the USFG with distinct benefits to the contracted system. The USFG would have the cultural and bureaucratic benefits of the armed forces. The use of DOD schools for training new aviators culturally would establish the same methods and thought processes utilized by the active duty military.²⁶⁵ Internal DOD training pipelines and operational inspections would ensure that the USFG would maintain the superior standards of performance, safety, and accountability that the active duty military forces keep, instead of the individual vendor meeting a insufficient FAA and Forest Service/BLM training requirement.²⁶⁶ The USFG would use highly

²⁶⁵ U.S. Congress, *14 U.S. Code §145 Navy Department*, accessed 04 May 2014 from <http://www.law.cornell.edu/uscode/text/14>. 14 USC §145 gives the Coast Guard access to DOD schools and provides a cultural link between similar units within the Navy and the Coast Guard, like aviation and maritime vessels. The USFD will continue this concept.

²⁶⁶ “Federal Aerial Firefighting Effectiveness,” 23; National Interagency Fire Center, *2014 National Aviation Plan*, (Boise ID: Department of the Interior: Bureau of Land Management and NIFC) 2–1, accessed <http://www.blm.gov/pgdata/etc/medialib/blm/nifc/aviation/administration.Par.39484.File.dat/NAP.pdf>.

aggressive tactics, like night flying and UAV incorporation, within the risk mitigation methods of the military. From the DOD shared culture, the USFG would utilize empowered aviators able to intelligently adapt and overcome challenges through analytical application to wildfire problems, instead of slavish devotion to traditional methods. The uniform nature and professionalism of the USFG would allow incident commanders a known quantity of performance in wildfire aviation.

Organized within the DHS, the USFG could employ statutory authorities and proactive methods dissimilar to active duty and National Guard units. Like the Coast Guard Title 14, the USFG Title 56 would permit an explicit use of unique service methods authorized by Congress; Title 56 would authorize the USFG to maintain liaisons and active operational partnerships within the NIFC and the NRF/NIMS structures. The DHS authority would allow the USFG to take a dynamic part in and authority of the NRF/NIMS, for wildfires in particular. Unlike military forces limited in participation until requested, the USFG could permanently fill the ground-based aviation dispatcher, supervisor, and manager positions in the NRF/ NIMS to permit direct communication and closer planning with the incident commanders.²⁶⁷

At the NIFC and GACCs, a permanent aviation coordination staff would facilitate USFG assignments to dispatch and fulfill aviation requests. In contrast to vendors or military assistance providing *al-a-carte* resources without active roles in planning, the USFG would maintain a substantial organizational framework for active participation in a reduced bureaucracy of national committees and boards. Within the wildfire aviation management organizations, the USFG would replace the fragmented Forest Service and BLM aviation boards and would have a permanent seat within the National Wildfire Coordinating Group (NWCG).²⁶⁸ The forward leaning authority of the USFG would

²⁶⁷*National Incident Management System*, DHS, December 2008, Appendix B 101–102, accessed from https://www.fema.gov/pdf/emergency/nims/NIMS_AppendixB.pdf.

²⁶⁸*National Interagency Fire Center, 2014 National Aviation Plan*, 2–1; National Interagency Fire Center, *Interagency Standards Fire Aviation*, 02–1. The NWCG coordinate the different interests of wildfire management from the various land management agencies in conjunction with close -to a dozen multi-departmental aviation boards, committees, and sub-committees.

allow the DHS to meet the mitigation and response to wildfires within the all hazards mandate.

In peacetime, the USFG would work directly with the NIFC and the NRF/NIMS. The close relationship and inclusion of the USFG into the wildfire organizations would permit a reduction in bureaucratic wastes and an increase in accountability. Working within the existing structures of the NIFC and the NRF/NIMS, the USFG could develop rapid response and anticipatory operations to wildfire aviation demands. The reduced bureaucratic glut of Forest Service, BLM, and interagency aviation committees and sub-committees would leave a single organization more responsive and accountable to the end-customers at the federal, state, and local levels.²⁶⁹ As a stand-alone agency and an armed service, the USFG could increase efficiencies and advancements to wildfire aviation through shortened communication channels, specific effectiveness studies and deliberate innovation initiatives with the defense industry.

The USFG could improve upon the existing aviation capabilities. The immense research and development resources of the armed services create revolutions in military science continuously, but they rarely revolutionize homeland security missions, like wildfires. The national security and homeland defense missions compel the military and National Guard to develop capabilities able to best meet these challenges; the few capabilities also able to assist in wildfire management, like cargo aircraft, UAVs, and utility helicopters, represent a small portion of the overall military resources. In contrast to the active duty military and National Guard, the USFG could focus capital and programs toward wildfire management needs. Purpose-built aircraft, sensors, equipment, and capabilities for wildfire aviation could alter the battle for wildfire management beyond a conventional numbers comparison.

²⁶⁹ “Federal Aerial Firefighting Effectiveness,” v. The contract based system has created a system of committees to run govern and control the contracts and interagency agreements. These leadership councils, “respect the mandates of the partner organizations, but do not resolve basic aerial firefighting organizational and accountability issues.”

2. Disadvantages

The organizational disadvantages of the USFG would be the wartime consequences and contributions to the national security and homeland defense missions of the DOD. As an armed service, the USFG would maintain a wartime contribution when and if drawn into the rest of the military. Devoted exclusively to wildfire aviation, the USFG would possess few capabilities that fit into the traditional military planning to defend the United States, other than surveillance and suppression of fires ignited during combat. In turn, the USFG could create a dependency for aviation units in domestic wildfire management that gaps the coverage in wartime. Without any civilian or military aviation units able to fill the gap, the United States would experience significantly damaging wildfires.

D. STATION FIRE

The USFG would drastically alter the Station Fire scenario, as it would have provided the operational framework and culture for a more effective firefighting organization and adaptive tactics. With an optimized resourcing system and historic risk-assessment methods, the USFG would apply the wildfire management doctrine of a strong initial attack and respond to the initial report of the Station Fire with a significant aggressiveness. The increased capabilities and integrated command and control of the USFG would have permitted a seamless flow of communications and wildfire strategies between the incident commanders and the USFG aviators. The alleviation of wildfire aviation costs from the Forest Service budget would have reduced ancillary distractions from the incident commander in order to utilize most effective and necessary strategies to contain the Station Fire.

Integrated fully into the planning, training, dispatching, and incident management system, the USFG would have sustained aggressive initial attack and situational awareness throughout the Station Fire. Purpose built wildfire aircraft and enhanced tactics permit the USFG to fight wildfires more effectively and safely permitting access to terrain avoided by contracted crews. A USFG air coordinator working beside the incident commander provides a USFG advocate and facilitates more rapid

communication between the commander and those carrying out the attack, instead of a dispassionate aviation supervisor placing orders for random aircraft.²⁷⁰ The unified command and control of the USFG from dispatch to the pilots would ensure complete coverage of requested assets and improves situational awareness at each stage of order fulfillment.²⁷¹ Enhanced capabilities, like UAVs and night vision devices, would have spotted the wildfire spreading during the first night and permitted night flying aircraft to safely continue the containment strategy.²⁷²

The fiscal separation of the USFG would insulate the money concerns from the incident manager. Through specific congressional allocations and supplemental funds, the USFG could maintain aggressive use of their assets without unnecessarily burdening managers involved in the attack. The distinctive DHS risk based approach to hazards would shape cost effective rationalization for wildfire aviation expenditures of the USFG; instead of the costs of mere management and replacement of damaged property, the DHS prioritizes preventing economic disruption. Under the DHS, the USFG would focus planning and prioritization to protect areas with the most significant economic and human risks, like metropolitan areas with historic wildfire threats.²⁷³ The USFG would manage efficiencies and accountability for waste through non-punitive investigations and applied lessons after the season to keep incident commanders focused on the tasks at hand.²⁷⁴ Employing the DHS matrix of priorities, modest USFG wildfire aviation expenditures

²⁷⁰“Station Fire,” 26–27. Critics question the aggressiveness of the fire aviation supervisor and the lack of communications between him and a contacted Martin Mars large airtanker available for a drop, that was turned away during the first day.

²⁷¹“Station Fire,” 29. The Station Fire experienced improper ordering methods during the first night that lead to delays and unaggressive attacks the next morning.

²⁷²“Station Fire,” 27; “Station Fire,” 14–15. The fire spread the first night across an uncontained portion called “the green island.” Critics emphasize the Forest Service night flying stance allowed the fire to escape containment during the night.

²⁷³*National Response Framework*, 20. Within the NRF, the DHS recognizes the value of economic impacts beyond the replacement costs directly affected by an incident. Mitigation costs in wildfire management ensures a reduced economic impact from infrastructure interdictions and lives lost; this reinforces aggressive aviation wildfire management and budget acceptance.

²⁷⁴“Station Fire,” 37. The Station Fire incident commander reportedly experienced significant concern about cost savings from a previously received Forest Service memo about budget shortfalls, while fighting the Station Fire.

would be more easily allocated and justified to Congress and firefighters utilize the most effective methods available.

E. CONCLUSION

The establishment of the USFG would create an organization that capitalizes on the benefits of the military and civilian frameworks. Taking over the aviation wildfire responsibilities, the USFG would alleviate the active duty military and National Guard from continuously called upon wildfire aviation responsibilities beyond DOD facilities. With a minor role in the national security mission, the USFG could follow a Title 56 mandate to focus on wildfire aviation through improvements to capabilities, strategies, and operational frameworks. The federal dollar could go further with the USFG through predictable overhead costs and flexible surge capacity that enhance cost efficiencies. Through the Coast Guard organizational framework, the USFG would provide military culture and capabilities, without more classical national security demands.

On the other hand, it must be recognized that establishing a new USFG would be a significant and costly undertaking. The establishment of the USFG would require a significant political and financial start up to create an entirely new agency within DHS. Operating in a contentious political climate, Congress would need to muster the political capital to pass legislation creating a new multibillion dollar armed service with several thousand personnel. Usually, for the Congress and the president to muster such massive changes they first require an epic focusing event on the scale of Pearl Harbor or the 9/11 attacks. In the absence of such a culturally devastating focusing wildfire event, the practical advantages of the USFG would need to convince the federal government to take action.

VI. CONCLUSIONS AND RECOMMENDATIONS

The research and analysis conducted for this thesis strongly suggest that the existing aviation wildfire support system fails to meet contemporary and future hazards to the United States. Aviation wildfire support has significant problems, including aircraft shortages and financial shortfalls, but the contract-based system is the most pressing. One of three options—based on active duty military forces, National Guard forces, or a new U.S. Fire Guard service established within DHS—must replace the current framework. This chapter compares the three approaches in an effort to determine which one best addresses the shortcomings of the contract-based framework for wildfire support.

A. COMPARISON

The contract-based framework showed several significant faults, including cost, culture, and innovation. The rising costs of managing wildfire hazards in climatically changing environments congested with urban expansion have out-priced the contract model. Aged aircraft reconfigured to fight wildfires with a bare minimum of safety and maintenance precautions fail to provide the service required for longer, hotter wildfire seasons. The culture of wildfire aircrews that drives them to fulfill their mission in the face of great difficulties also, perversely, encourages these skilled firefighters to accept unnecessary adversity and risk because the contracted approach has permitted safety and maintenance to suffer. The aviation wildfire culture also has obstructed effectiveness studies and discouraged constructive analysis of tactics and methods; dogmatic tradition leads, instead of reason and evaluation. The contract-based system exacerbated the cultural overreliance on tradition by creating barriers between operators and wildfire management officials. The contract-based arrangement stifled incentives to develop and employ innovations like night-vision devices, UAV surveillance, and a pooled system of national assets—all of which could have altered the course of the Station Fire.

Table 2 illustrates the similarities and differences in the three options as this thesis has explained them. The left column is a list of the primary analysis categories discussed

in the thesis to measure the effectiveness and appropriateness of each option in the columns taking over national aviation wildfire support. Each row draws on the analysis made throughout the chapters of the thesis.

	ACTIVE DUTY MILITARY	NATIONAL GUARD	U.S. FIRE GUARD
POLITICS	FEW CHANGES REQUIRED	NO CHANGES REQUIRED	MAJOR CHANGES REQUIRED
LAW	USE EXISTING STRUCTURE (STAFFORD ACT, MOU'S/INTERAGENCY AGREEMENTS, IRA)	DUAL USE - STATE and FEDERAL	SPECIFIC CONGRESSIONAL AUTHORITY
SOCIETY	SOME ANXIETY/ BUT COMFORTABLE WITH ALREADY	EXPECTED	UPGRADING THE FOREST SERVICE LIKE THE COAST GUARD
NATIONAL SECURITY	MAJOR DISTRACTION	MINOR DISTRACTION	NO DISTRACTION (unless War)
FISCAL COST	MAJOR RESTRUCTURING	MINOR RESTRUCTURING	MAJOR START UP COSTS
EQUIPMENT	NEW PURCHASE/ REPURPOSE	NEW PURCHASE/ REPURPOSE	INTERAGENCY TRANSFER / NEW PURPOSE BUILT
FUNDING	DOD BUDGET	DOD BUDGET / STATE BUDGETS	DHS BUDGET
CULTURE	PROFESSIONAL MILITARY	PROFESSIONAL MILITARY	PROFESSIONAL MILITARY WITH WILDFIRE EXPERTISE
SAFETY	PROFESSIONAL MILITARY	PROFESSIONAL MILITARY	PROFESSIONAL MILITARY WITH WILDFIRE EXPERTISE
INNOVATION	DOD AND INDUSTRY R&D	DOD AND INDUSTRY R&D	DOD AND INDUSTRY R&D WITH WILDFIRE FOCUS
SELF ANALYSIS	PROFESSIONAL MILITARY	PROFESSIONAL MILITARY	PROFESSIONAL MILITARY
BUREAUCRATIC	PROFESSIONAL MILITARY	PROFESSIONAL MILITARY / STATE	DHS AND SEPARATE ARMED SERVICE
WILDFIRE PRIORITY	NOT PRIMARY MISSION	ONE OF SEVERAL PRIMARY HOMELAND DEFENSE/ SECURITY MISSIONS	PRIMARY MISSION

Table 2. Option comparison

B. ANALYSIS

The political and legal effects of the three options lean in favor of the National Guard option, in terms of reduced complexity. The U.S. Fire Guard option would require a significant political and legal effort to establish, organize, and institutionalize such an agency in the role of aviation wildfire support—and such lengths are likely only in the

wake of major focusing events like World War II or the 9/11 attacks. Similarly, the active duty military option would demand a moderate shift in the political and legal establishment to restructure and reorient mission priorities. The National Guard option requires almost no legal or political exertion, as the National Guard provides substantial portions of the wildfire aviation mission today. To take over the mission and function completely, the National Guard would need only increased strategic coordination among the states and the federal government.

The three options parallel each other in the cultural, safety, innovation, and self-analysis portions of the comparison. Each option brings to bear a professional military culture, or at least the foundations of that culture, through training, doctrine, and standards. A similar training background, maintenance standards, and quality assurance ties the three options together in their expected effects. Comparable access to advanced technologies and innovative companies give each option the same opportunities to enhance the performance of aviation wildfire support. The three options rely on the benefits of military indoctrination and professionalism to sustain a safety culture that manages and mitigates risk, instead of the raw acceptance of risk from contract-based system.

1. Active Duty

The active duty model would employ units capable of dual combat and homeland security roles, including wildfire aviation. Through restructuring the military for a balanced homeland security mission on par with national security commitments, the active duty would equip, train, and sustain designated units of the armed services for tasking in domestic, wildfire support missions. USNORTHCOM would coordinate and command the active duty military units in conjunction with requests from the NIFC. Prepositioning units during the wildfire season would follow existing protocols established by the Stafford Act and interagency agreements. Reimbursement to the DOD for services would comply with the provisions of the Economy Act.

The active duty military option retains several advantages. First, the immense size and resources of the U.S. military provides a plethora of military aircraft that can

more than meet the numbers requirements for the United States wildfire management system. Second, the existing assets of the military permit a reduced annual rate to the Forest Service and BLM for aviation support compared to the escalating maintenance and operational costs of the aged aircraft of the contract-based approach. Third, the professional military institution would support the wildfire aviation units with maintenance support, excellent aircrew training, and a risk management safety culture established from decades of deliberate studies and evaluations.

The disadvantages of the active duty option outweigh the advantages for taking over the wildfire aviation mission. First, the military must place the traditional military missions of fighting and winning wars ahead of additional homeland security missions. During a time of war, the military can ill afford further distractions without significant additional resources. Second, a multitasking split of aircraft and crews would necessarily skew the mission balance towards the primary military duties and requirements for combat operations. Such a hastened transition from one mission type to another contributed to the deadly crash of a C-130 MAFFS aircraft in 2012; the mishap demonstrated that crews experience great challenges when changing missions away from what they primarily train and equip for.²⁷⁵ Third, the civil-military relations within the United States would inflame with an over-militarization of yet another government service. Existing interagency agreements and statutory law may permit the temporary use of the military for national emergencies, but a standing homeland security mission on the magnitude required for wildfire support, would raise political and social concerns of a praetorian state. The active duty must remain focused on fighting and winning the nation's wars; in a fiscally austere wartime environment, the active duty option is out.

2. U.S. Fire Guard

The creation of a U.S. Fire Guard would establish the most capable alternative to the contracted operational framework; unfortunately, it too is unfeasible in a fiscally tight and politically contentious time. An act by Congress would establish and fund the United States Fire Guard along the organizational model of the U.S. Coast Guard, an armed

²⁷⁵“Accident Report: C-130H3,” 34.

service that operates within the DHS. The USFG assets would receive training, maintenance, and operational support from the DOD, but it would remain under the DHS authority. The USFG would operate a mixed fleet of helicopters, fixed-wing aircraft, and UAVs entirely dedicated to the wildfire support mission. Unfortunately, a Congressionally authorized and funded armed service with dedicated resources to fight wildfires is currently a fantastic dream.

The USFG would have distinct advantages compared to the contract-based approach and the other options. First, the USFG would have the same military advantages of the other two options: professional aviation training and culture, institutionalized safety and maintenance, access to defense-industrial research and technologies, and aircrews that would participate in improving the methods and process of wildfire management. Second, the USFG would allow focused development of aviation assets with wholly wildfire purposes, like scooper aircraft and light crop-duster SEATS. Third, the USFG would not detract from the military readiness of the United States. Except in the time of declared war, the USFG would not steal away necessary military resources or personnel to fight wildfires.

However, the startup costs and political capital required to craft and pass legislation for a USFG places such a service well out of the reach at this time. The initial resourcing and staffing of the USFG would require billions of dollars and an immense annual budget to operate and maintain aircraft and aircrew readiness. In the absence of a major focusing wildfire event, the United States fails to recognize the hazards of wildfires beyond a seasonal nuisance for the western portion of the nation. Without an outpouring of societal pressure and demand for greater wildfire management, the political will to craft and pass the necessary legislation exceeds the threshold of risk for any politician, especially during a fiscally tight and politically contentious period.

3. National Guard

The National Guard option is the most appropriate fit to take over the wildfire aviation mission. It is a feasible option with very little political and fiscal capital required to implement and sustain within the existing federal and state structures. The civil-

military understanding in the United States already expects the National Guard to hold a significant portion of wildfire management responsibilities; a complete take-over is a reasonable progression of this expectation. The military culture advantages of the National Guard resolve the problems of the contract-based approach—through institutionalized safety and maintenance standards, a professional military flight crew actively engaged in improving the methods and processes, and established patterns of incorporating innovations and advanced technologies.

The societal analysis points to the National Guard as the favorite. Congress and the executive have enhanced the involvement of the active duty military in domestic issues, but the public perception remains skeptical. The American public reacts unfavorably to the militarization of basic services like law enforcement, but the National Guard has some signal differences when compared to the active duty military. With express exception to law enforcement restrictions of Posse Comitatus and the dedicated charge for response to national emergencies, the National Guard is expected to have an elevated role in natural disasters, like wildfires. Thus, the American people likely would see the takeover of the wildfire aviation mission by the National Guard as a minor extension of an existing duty with no new pressures on the civil-military balance. The USFG should avoid the praetorian fears as it would be viewed as a unification of the fractured system, instead of an expansion of military influence.

The national security analysis supports the USFG option, with the fewest repercussions to the security and defense of the United States. The active duty military option places the wildfire aviation mission at least on par with homeland defense and national security. In turn, the shrinking military would reduce strategic and operational focus on traditional missions, placing the United States in greater risk to deter and defend against threats. With inflexible commitments to wildfire management, the National Guard option risks increased distractions from the operational reserve and homeland defense duties of the National Guard. In contrast, the single-threat focus of the USFG would allow resources to be dedicated to wildfire aviation without sacrificing other responsibilities. A USFG actually would reduce the diversion of the active duty armed

forces and the National Guard from their primary missions by eliminating the need for their assistance to fight wildfires.

The National Guard option is the most suitable of the three to take over wildfire aviation from the contract-based system. With little restructuring, capital, or national security impact, the National Guard meets the expectations that the United States public already perceives as its role in the homeland, and with MAFFS and other assistance, it already does. Since the 9/11 attacks and the Global War on Terror, the funding and reshaping of the National Guard has molded it into a more capable force able to meet the demands of homeland security and defense missions.

The National Guard option would allow the most flexibility to respond without impacting other national level concerns. The dual state and federal roles of the National Guard allow for states that understand their wildfire hazards to advocate for federal assistance and contribute state funds to bolster their National Guard aviation units. As the most threatened states increase their aviation assets, other less threatened states can benefit from the increased capabilities through state to state National Guard sharing agreements, like EMAC. National security and defense benefits as the active duty military can focus on traditional military missions free from additional distractions of periodic drains on resources and manpower for wildfire support.

In addition, the command and control of the National Guard units by the state and integrated into the DOD permits a flexible response for either the state governors or the president to utilize the assets, without creating entirely new organizations. The Title 32 and State Active Duty status permit the state governors to rapidly utilize the combined national resources of the National Guard to protect their states, without the need for federal action. The Title 10 federalized status and interagency agreements between the DOD and wildfire management agencies permits the federal government to share the burden of wildfires with the states and to protect federal lands. The reimbursement for both state sharing and federal interagency sharing follows the provisions of the Economy Act. The existing cost model for the MAFFS illustrates a more cost-effective and predictable solution, compared to the contract-based approach.

Comparably, the effort and resources needed to develop and sustain the National Guard option are easier to stomach by law makers and tax payers. Indeed, the responsibilities turn over can occur almost immediately after a few more MAFFS and helicopter buckets are acquired and crews trained. Under existing limitations, the National Guard alternative is the most practical solution for the United States.

C. RECOMMENDATIONS

Wildfire incident management officials and wildfire aviation experts should plan for a two-year turnover of duties with the National Guard. A methodic turnover allows the wildfire incident managers to rely on the existing level of support until the National Guard units have achieved a certain level of proficiency. Experienced leaders in the field would train National Guard units about existing methods and procedures; first with the units most likely to respond in the high risk states and then to other participating states. In time, the National Guard units will own and develop their own standardized methods for wildfire aviation missions. A seamless transition to the National Guard would avoid gaps in wildfire aviation coverage and unnecessary risks due to haste.

The National Guard should start the procurement process of new aviation assets to augment the existing National Guard forces in wildfire aviation. The wildfire incident commanders rave about the existing performance contributions of SEATs, scoopers, and light helicopters, many of which fail to have comparable aircraft types flown by the National Guard.²⁷⁶ A new military aircraft able to perform similar tasks as these aircraft allow a similar tactical choice of incident commanders. On some fires, using a larger aircraft like a C-130 is wasteful compared to a low-cost, rapid cycle light aircraft. Incorporating UAVs and other military advancements into some of these roles reduces risks and costs, while increasing asset availability.

²⁷⁶“Fire Improvements Needed,” 35; “Firefighting Aircraft,” 10-11; Keating et al., “Air Attack Against Wildfires,” xviii.

D. ADDITIONAL STUDY

Wildfire incident management in the United States requires an aviation effectiveness study that focuses on all aircraft missions. Past analyses by RAND, AVID, the GAO, and others suffer from gaps in empirical data for the effective use of all types of aircraft involved in wildfire aviation.²⁷⁷ In the absence of this evidence, incident commanders and industry officials have relied on historical assumptions for force composition and procedures.

A study by both the wildfire crews and incident managers must focus on the impact certain practices and aircraft types have on the fighting of wildfires. First and foremost, the wildfire enterprise needs evidence of the effectiveness or ineffectiveness of each type of aircraft operating in the suppression role in a mix of environments. Similarly, each mission set requires an objective analysis to evaluate gaps and unnecessary redundancies. Armed with the facts, the aviation leadership can develop more thorough doctrine governing aircraft tactics and procedures based on calculated analysis, instead of unproven traditions. Learning what works and does not can allow specific long-term acquisitions to size and shape the air fleet correctly. A professional analysis can convince lawmakers to greater support and fund better equipment, facilities, and training for wildfire aviation in general.

Additional work must study the most effective mix of aircraft. Several studies from RAND, AVID, and others have concluded certain levels of large airtankers required to meet the current level of demand; however, little study has focused sufficient effort on the total composition of additional aircraft.

In certain geographic regions some aircraft types have advantages over others. Large airtankers carry more retardant, but small airtankers and helicopters have quicker turnaround aided by many small runways and forward helicopter bases. Scooper aircraft require an open body of water to fill from, while large and very large airtankers need major established runways that take them well away from most wildfire areas. Any future

²⁷⁷Keating et al., “Air Attack Against Wildfires,” xvii-xviii; “Firefighting Aircraft,” 6; “Fire Improvements Needed,” 37.

composition study must incorporate UAVs into the balance, as well as how to encourage greater implementation of UAVs into traditional and innovative mission sets.

The existing operational framework of aviation support for wildfire management is fatally flawed. There are many problems, including a lack of resources, inflexible organizations, and a firefighting culture that too often stifles study and innovation. But one of the most critical problems stems from the over-reliance on contracted aviation support, in particular with the U.S. Forest Service. The United States could save lives, protect land, and better preserve homeland security if this contract support system was replaced by a model organized around the National Guard. With little to no additional political or legal changes, the National Guard can take over the wildfire aviation mission and meet the American public's existing perceptions of National Guard involvement in natural disasters. The National Guard already contributes significant resources to the broken wildfire aviation system and a take over the mission would only result a minor impact to other national emergencies and national security missions.

With an existing force structure in every state and territory and improved operational relationships with civil and federal authorities, the National Guard is the most practical choice to replace the faulty wildfire aviation system. The National Guard has the professional military culture and homeland security oriented mentality to provide both state governors and the federal government better results per tax dollar spent. The best hope for the United States to counter the rising hazards of wildfires is to entrust the National Guard with aviation wildfire support.

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