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State Funding for Wildfire Suppression in the Western U.S.

by

Philip S. Cook and Dennis R. Becker, Ph.D.*

ABSTRACT

The number of large wildfires and area burned by wildfires in the western U.S. have increased significantly over the last 30 years and are expected to continue to do so. This study examines state costs for wildfire suppression in the western U.S. over the last decade and compares funding approaches to paying those costs. The purpose is to improve management of state fiscal resources and to identify alternative funding mechanisms in the context of potentially escalating costs and policy questions about who should bear those costs.

State agencies responsible for wildfire suppression in each of 12 western states were asked to provide funding information about their state's wildfire suppression costs from 2005 to 2015. Ten states responded (Alaska, Arizona, California, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Washington). State statutes, administrative rules, and other policies related to funding wildfire suppression from the participating states were reviewed and summarized. The various mechanisms used by the states to pay wildfire suppression costs were analyzed in light of general criteria for evaluating public finance revenue systems: ability to produce sufficient revenue, ability to deal with fluctuations in costs, equity, and promotion of cost control.

The number of acres of state and private lands burned annually ranged from 0.6 million in 2010 and 2014 to 2.2 million acres in 2015. This is in addition to the number of acres of federal lands burned. There was no clear pattern of number of acres burned over the study period, but variability between years was significant. Annual suppression costs for all states including reimbursements plus state obligations ranged from $774 million in 2005 to $1.84 billion in 2015 in inflation-adjusted dollars. Costs trended upward at 5.2% annually, but were highly variable. Costs for years 2005 and 2006 were below the annual average of $1.16 billion, followed by three years of costs slightly above average, followed by three years of below average costs. The last three years of the study period saw costs above average, with 2015 being an extreme year. State obligations for suppression costs averaged less than one-half percent of total General Fund revenues, but in extreme years exceeded two percent in some states creating policy tradeoffs.

States use a variety of mechanisms to pay for wildfire suppression. Some costs are reimbursed by the federal government through cost share agreements and Fire Management Assistance Grants. Remaining state obligations are paid through a variety of mechanisms that vary by state but include: General Fund appropriations prior to incurring wildfire costs; General Fund appropriations after incurring wildfire costs; landowner assessments; assessments on timber harvests; private insurance programs; revenues from unrelated activities; disaster response accounts; and legal action. Some states use a single mechanism while others use a combination of methods to meet their cost obligations.

*Principal Researcher and Director, respectively, Policy Analysis Group

University of Idaho
College of Natural Resources
Policy Analysis Group

875 Perimeter Drive MS 1134
Moscow, Idaho 83844-1134
208-885-5776
pag@uidaho.edu
uidaho.edu/cnr/pag

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State Forester
Alaska Division of Forestry
Anchorage, Alaska

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State Forester
New Mexico Forestry Division
Santa Fe, New Mexico

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Director
California Dept. of Forestry and Fire Protection
Sacramento, California

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State Forester
Oregon Dept. of Forestry
Salem, Oregon

Vaughn Jones
Wildland Fire Management Section Chief
Colorado Division of Fire Prevention and Control
Lakewood, Colorado

Brian Cottam
Director, State Forester
Utah Division of Forestry, Fire and State Lands
Salt Lake City, Utah

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EXECUTIVE SUMMARY

The number of large wildfires and area burned by wildfires in the western U.S. have increased significantly over the last 30 years and are expected to continue to do so in the future. Much attention has been paid to the escalating costs of wildfire suppression for federal agencies, but little attention has been paid to how much states spend on suppression and how those expenditures have been changing. This study examines state costs for wildfire suppression in the western U.S. over the last decade and compares funding approaches to paying those costs. The purpose is to improve management of state fiscal resources and to identify alternative funding mechanisms in the context of potentially escalating costs and policy questions about who should bear those costs.

State agencies responsible for wildfire suppression in each of 12 western states were asked to provide funding information about their state's wildfire suppression costs from 2005 to 2015. Agencies also were asked to report total acres burned by ownership for the same time period. Ten states responded (Alaska, Arizona, California, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Washington). State statutes, administrative rules, and other policies related to funding wildfire suppression from the participating states were reviewed and summarized. The various mechanisms used by the states to pay wildfire suppression costs were analyzed in light of general criteria for evaluating public finance revenue systems: ability to produce sufficient revenue, ability to deal with fluctuations in costs, equity, and promotion of cost control.

The number of acres of state and private lands burned annually ranged from 0.6 million in 2010 and 2014 to 2.2 million acres in 2015. This is in addition to the number of acres of federal lands burned. There was no clear pattern of number of acres burned over the study period, but variability between years was significant. Two years (2009 and 2015) were well above the average of 1.2 million acres per year, while two years (2010 and 2014) were well below average.

Variability was also a key characteristic of state wildfire suppression costs. Annual suppression costs for all states including reimbursements plus state obligations ranged from $774 million in 2005 to $1.84 billion in 2015 in inflation-adjusted dollars, with an annual average of $1.16 billion. Costs trended upward at 5.2% annually, but were highly variable. Costs for years 2005 and 2006 were below average, followed by three years of costs slightly above average, followed by three years of below average costs. The last three years of the study period saw costs above average, with 2015 being an extreme year. Variability of both acres burned and suppression costs from year to year is highlighted because it raises policy issues related to budgeting for future years. For instance, state obligations for suppression costs averaged less than one percent of total state General Fund revenues, but in extreme years exceeded two percent in some states creating fiscal challenges and policy tradeoffs.

States use a variety of mechanisms to pay for wildfire suppression. Some costs are reimbursed by the federal government through cost share agreements and Fire Management Assistance Grants as well as reimbursements from other state and local entities. Remaining state obligations are paid through a variety of mechanisms that vary by state but include:

- General Fund appropriations prior to incurring wildfire costs,
- General Fund appropriations after incurring wildfire costs,
- Landowner assessments,
- Assessments on timber harvests,
- Private insurance programs,
- Revenues from unrelated activities,
- Disaster response accounts, and
- Legal action.

Some states use a single mechanism while others use a combination of methods to meet their cost obligations. Appropriating General Funds after incurring wildfire suppression costs is used by all states. Seven of 10 states (Alaska, Arizona, California, Montana, Oregon, Utah, Washington) also regularly provide a base appropriation from General Funds prior to incurring costs. Oregon is the only state that

uses a private insurance program. Utah is the only state that uses revenues from an unrelated activity, i.e., bonus payments from federal mineral leases. Washington is the only state with a multi-source disaster response account to absorb extreme costs. Although all states have legal mechanisms that allow for cost recovery due to negligence and civil or criminal penalties, no state reported these legal cost recoveries as a major source of funding.

This study did not attempt to identify one state's funding system as better than another, but rather uses general public finance criteria to point out advantages and disadvantages of each funding mechanism, particularly in light of annual variability of costs and potential for increasing costs in the future. For example, some mechanisms, such as General Funds, may provide sufficient revenue but opportunity costs for other uses of that revenue exist. The variability in annual costs creates challenges for budgeting General Funds. Some mechanisms such as private insurance and disaster response accounts are meant to handle only extreme events and not increasing ordinary costs. Landowner assessments may raise equity issues as agencies attempt to balance the private and public benefits from fire protection. Funding systems that promote cost control through both agency firefighting actions and landowner risk reduction also may be preferable.

States are policy laboratories and can learn from one another. Years with large wildfires and high suppression costs may bring funding issues to the forefront of public dialogue and policy maker's attention and present a window of opportunity for policy change within a state.

INTRODUCTION

The number of large wildfires and area burned by wildfires in the western U.S. have increased significantly over the last 30 years (Westerling et al. 2006, Morgan et al. 2008, Dennison et al. 2014, Higuera et al. 2015). The intensity and extent of wildfire activity in the region also are expected to continue increasing (Brown et al. 2004, Yue et al. 2013, Hamilton 2014, Liu and Wimberley 2016). Costs associated with wildfires, including loss of life and property, have been significant (Western Forestry Leadership Coalition 2010), and the financial burden to federal agencies has significantly escalated over the past two decades (Gorte 2011, Ellison et al. 2015, Brusentev and Vroman 2016). The federal government routinely spends more than $1.0 billion annually on wildfire suppression (Hoover et al. 2015), and the USDA Forest Service (USFS) now expends more than half of its total agency budget on wildfire management (USFS 2015).

Much attention has been paid to escalating costs for federal agencies and their ability to reduce wildfire suppression expenditures (e.g., Calkin et al. 2005, Hoover et al. 2015, USFS 2015, Brusentsev and Vroman 2016). Much less attention has been paid to how much states spend on wildfire suppression, how those expenditures have been changing, and what is driving those changes. The financial burden of wildfire suppression activities on state budgets and the funding mechanisms used to support those activities are not well understood outside each state and the firefighting agencies themselves. This study aims to improve that understanding.

Wildfire management includes a variety of activities that occur before, during, and after a fire. For example, wildfire prevention activities are directed at reducing the incidence of fire or the magnitude of wildfire effects prior to a fire. Preparedness or pre-suppression activities are directed at ensuring adequate resources are available when a wildfire does occur. Suppression activities are actions to extinguish or contain a fire, beginning with its discovery (NWCG 2015). Sometimes there is not a clear demarcation in policy, practice, or funding between preparedness and suppression activities. However, to the extent practical, this study focuses on the funding of suppression activities.

Previous research

Little research has explicitly examined state funding for wildfire suppression. Some states have conducted their own reviews (e.g., Headwaters Economics 2008, FSC GROUP 2013, Stambro et al. 2014), but have not taken an in depth look comparing funding approaches across states. The only comprehensive multi-state analysis was a periodic survey of state foresters conducted for the National Association of State Foresters (NASF; QB Consulting and Straight Arrow Consulting 2010 and 2012; Industry Insights, Inc. 2015a and 2015b).

The NASF surveys found that wildfire program expenditures by state forestry agencies increased from about $750 million in 1998 to $1.7 billion in 2014. In real dollars (adjusted for inflation to 2014 using the Consumer Price Index), wildfire program expenditures increased from $1.1 billion in 1998 to $1.7 billion in 2014, a 55% increase. It is important to note that the increase was for total wildfire *program* expenditures—prevention, preparedness, suppression, post-fire, etc.—not just suppression. Also, although spending on wildfire programs increased, the proportion of total agency expenditures devoted to wildfire programs remained rather stable at between 60% and 69%. In other words, overall agency spending increased at a rate similar to wildfire program spending. NASF surveys also found that most state wildfire program expenditures occured in western states, varying between 70% and 78% of the national total.

Research objective

This study examines state costs for wildfire suppression over the last decade and compares state funding approaches. The purpose is to improve management of state fiscal resources and to identify alternative funding mechanisms in the context of potentially escalating costs and policy questions about who should bear those costs.

METHODS

State agencies responsible for wildfire suppression in each of 12 western states (Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming; **Figure 1**) were asked to provide funding information about their state's wildfire suppression costs from 2005 to 2015. This study focuses on wildfire suppression costs, not prevention, preparedness, post-fire, or other costs related to wildfire, unless explicitly noted. States self-identified those costs considered to be for wildfire suppression. Agencies were asked specifically to identify sources of funding to pay those costs by year from 2005 to 2015. Sources of funding, which were generally organized into reimbursed expenses and state obligations, were classified into the subcategories listed in **Table 1**. Agencies also were asked to report total acres burned each year from 2005 to 2015 by ownership category (federal, state, private).

Figure 1. Twelve western U.S. states and 10 states that provided data.

State statutes, administrative rules, and other policies related to funding wildfire suppression from participating states were reviewed. Those policies were summarized and changes in funding sources during the study period, 2005-2015, identified. Participating state representatives reviewed the study findings for clarity and accuracy. No state wildfire suppression funding information is reported for states that did not respond to the data request.

RESULTS

Wildfire Area

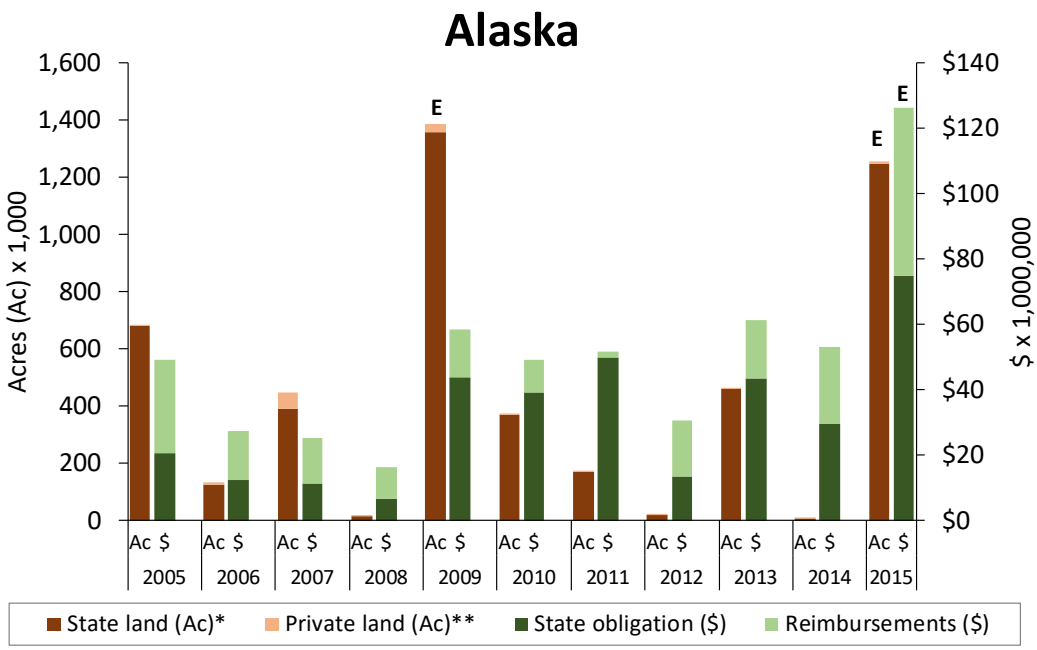
In general, states are responsible for wildfire suppression on nonfederal lands. In some states, where logistically it makes more sense, state agencies trade protection of isolated parcels of federal land for federal protection of isolated parcels of state and private lands. For example, in Idaho, federal agencies protect about 864,000 acres of state and private land, while the Idaho Department of Lands is responsible for protection of about 867,000 acres of federal land (IDL 2016).

Table 1. Types of funding sources for state wildfire suppression costs.

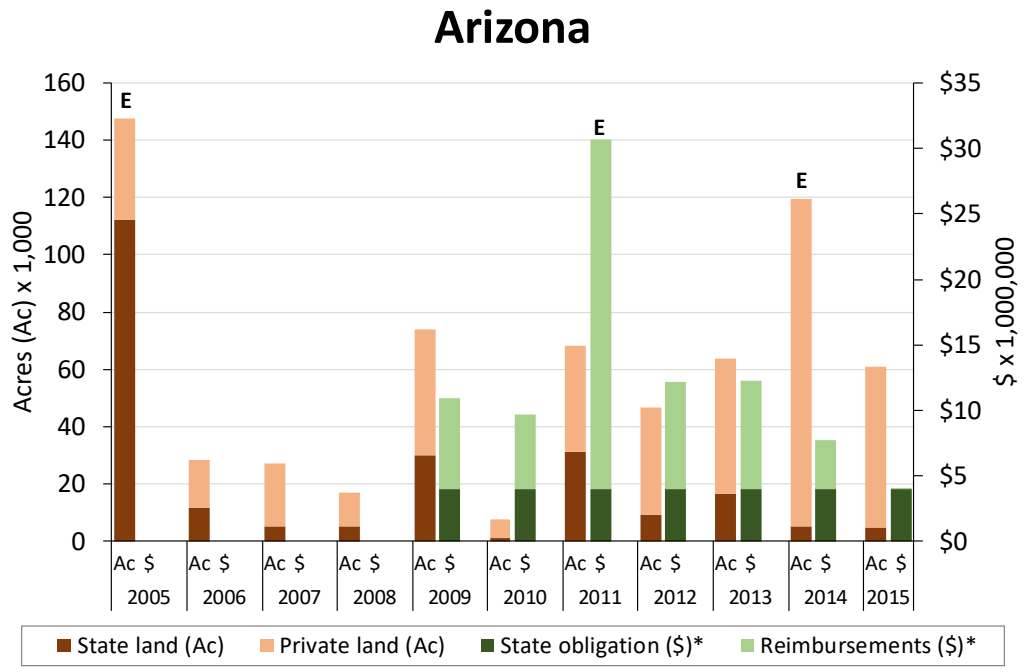
Reimbursements	Costs incurred by the state but for which it receives reimbursement from another entity.
Federal	Reimbursements from cost share agreements with federal agencies, Fire Management Assistance Grants from the Federal Emergency Management Agency (FEMA), or other federal programs.
Other	Reimbursements from other state agencies, other states or countries, and private sources.
State obligation	Remaining state costs not paid through reimbursements.
General Fund appropriations prior to incurring costs	Base appropriation from a state's General Fund prior to fire season before suppression expenses are incurred.
General Fund appropriations after incurring costs	Supplemental, emergency, or deficit appropriation from a state's General Fund post fire season after suppression expenses are incurred.
Landowner assessment	Landowners are assessed a fee for fire protection based on the number of acres owned or characteristics of land (e.g., forest in the wildland urban interface).
Assessment on timber harvests	Owners of timber are assessed a fee for fire protection based on volume of timber harvested.
Insurance	Private insurance is purchased by state to pay extreme costs.
Revenues from unrelated activities	Revenues from an activity unrelated to wildfire are used to pay costs (e.g., federal mineral lease payments, insurance premium taxes).
Disaster response account	Extreme costs are classified as a disaster and a specified disaster account with multiple sources of revenue pays costs.
Cost recovery via legal action	Costs for human-caused fires are recovered based on laws related to liability and negligence.
Other	Other mechanisms including payments from counties, timber salvage sales, etc.

Total acres burned by wildfire each year from 2005 to 2015 on state and private lands for the 10 western states that responded to the data request are reported in **Figure 2** (brown and tan bars). Idaho, Oregon, and Washington reported acres burned under state protection, not differentiated by state or private ownership. Data for California, Colorado, and Utah are from annual wildland fire summaries produced by the National Interagency Fire Center (NIFC 2016a).

Acres burned in each state were variable by year, showing no clear trend of increase or decrease during the study period. Lack of a clear pattern or trend across the region reflects the variable nature of wildfire and the geographic scope of the western U.S. Weather, vegetation type and moisture, fire management activities, and numerous other factors vary from year to year and across landscapes. But this finding does not contradict findings of previous research of increasing trends in acres burned since the 1980s. First, data from the current study period contain several high-fire years, just not a significant increasing trend. Second, much of the increase in acres burned over the last 30 years took place in the 1990s and early 2000s, before the study period. Third, the 11-year study period is too short for determining a trend when variance between years is high. Finally, only state and private lands were analyzed, not all land ownerships. The increase in fire extent on federal lands has been well documented.



* Includes Native Corporation lands billed through Alaska Fire Service.
** Includes borough lands.

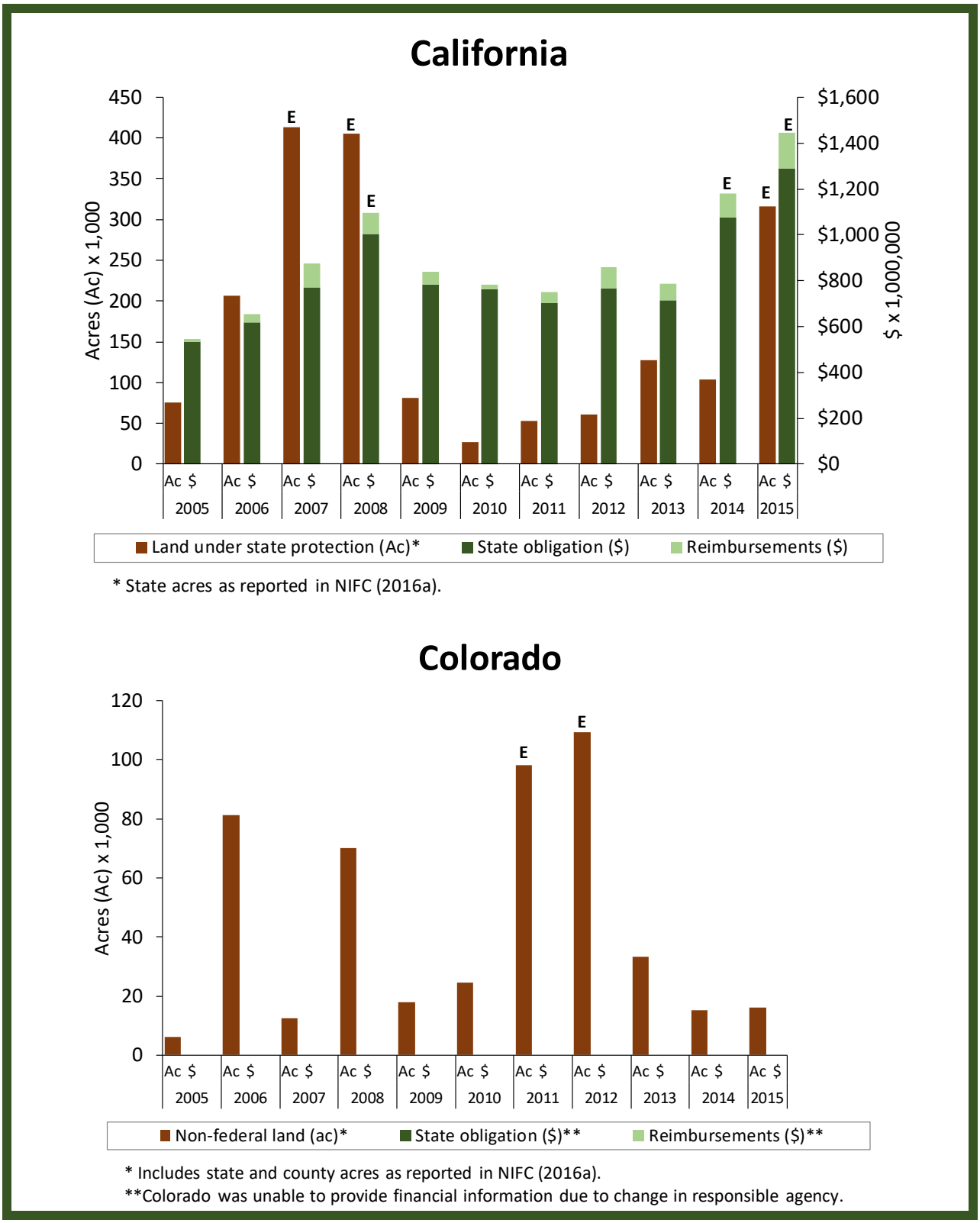


* State reimbursement and obligation cost data unavailable 2005-2008. Reimbursement data incomplete for 2015.

Figure 2. State and private acres burned and state suppression costs (state obligation and reimbursements), 2005-2015.

Note: **E** = extreme year, defined as greater than one standard deviation above the mean for study period.

Data sources: State wildfire agencies, unless otherwise noted.



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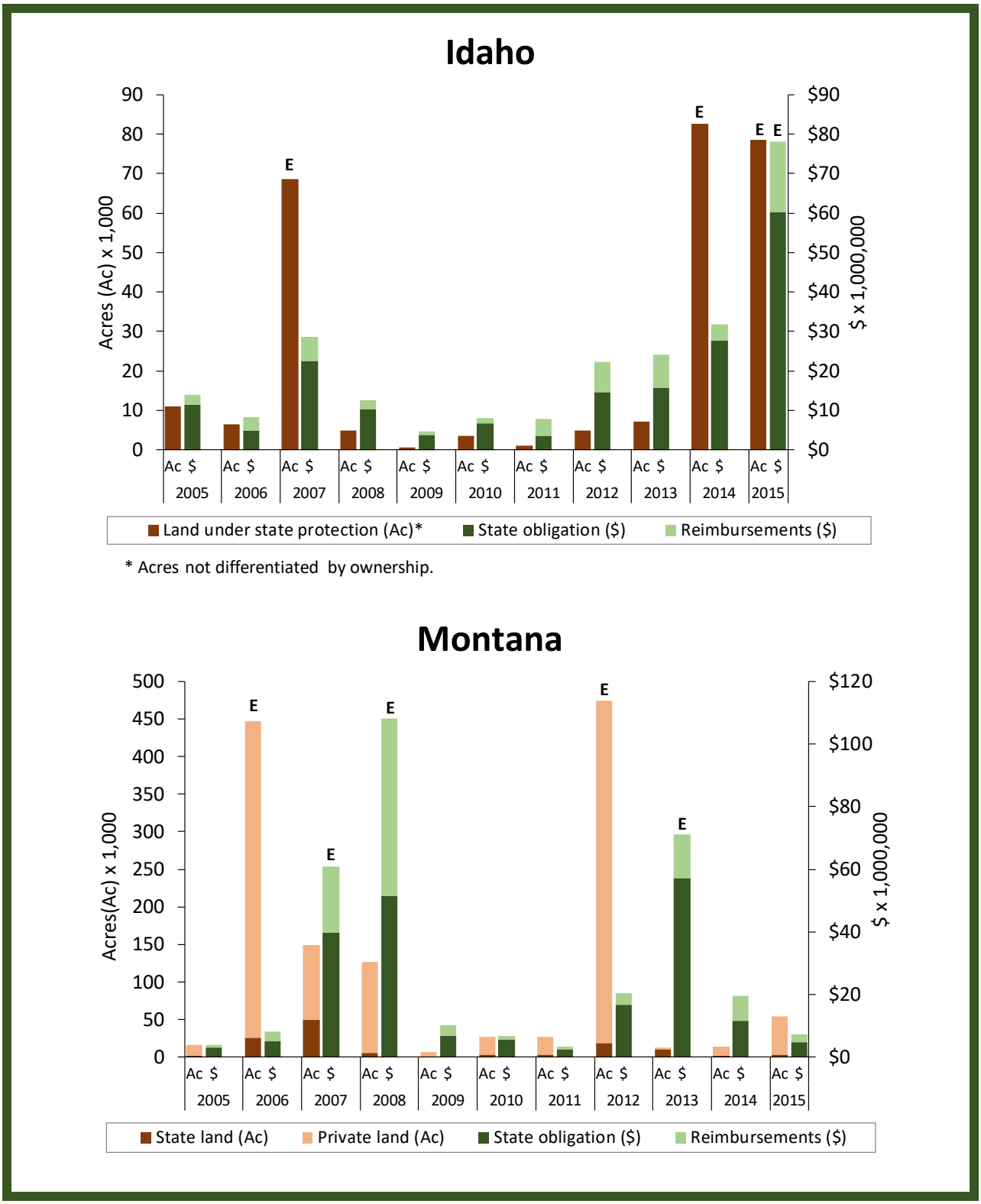

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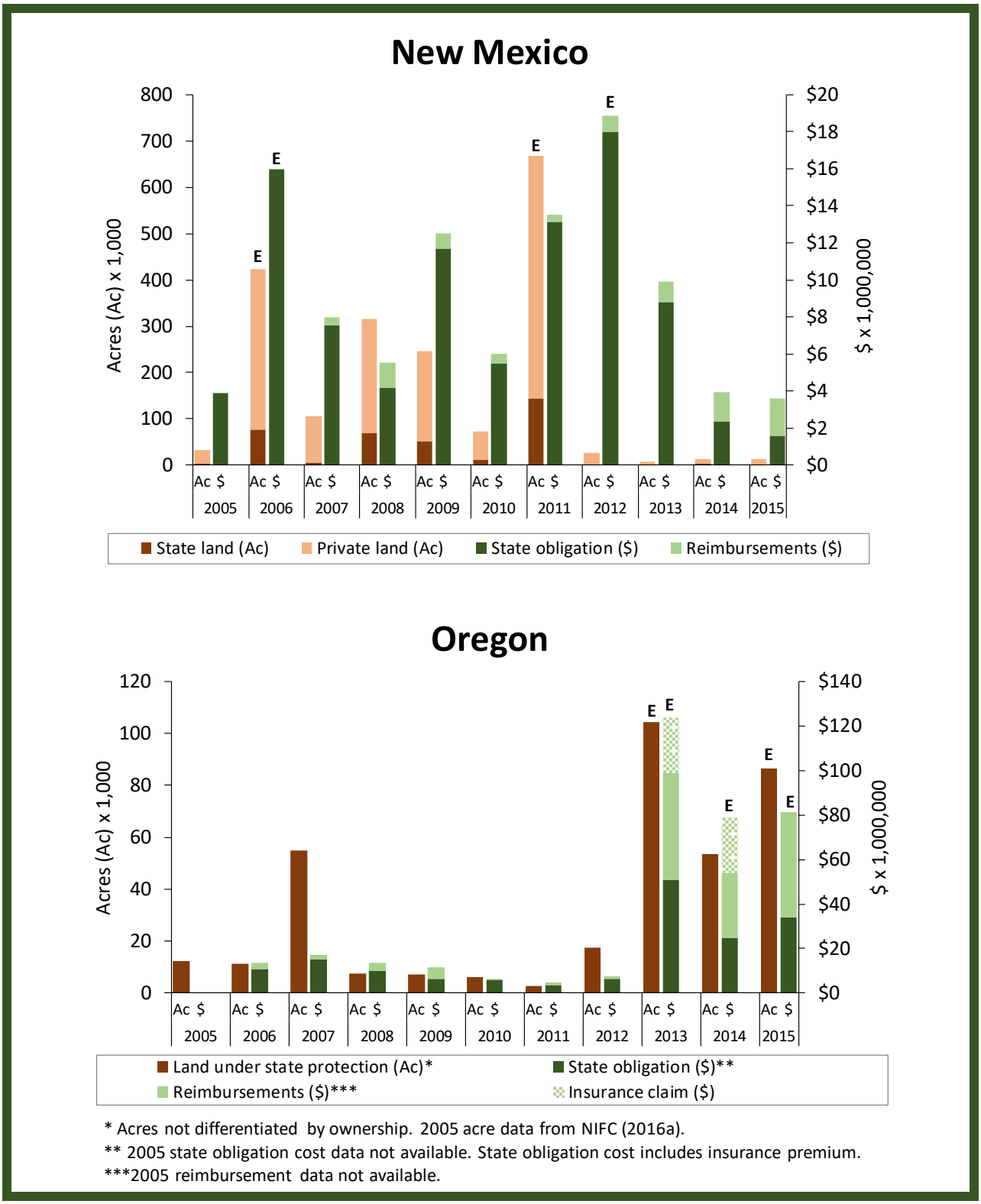

* Acres not differentiated by ownership. 2005 acre data from NIFC (2016a).

** 2005 state obligation cost data not available. State obligation cost includes insurance premium.

***2005 reimbursement data not available.

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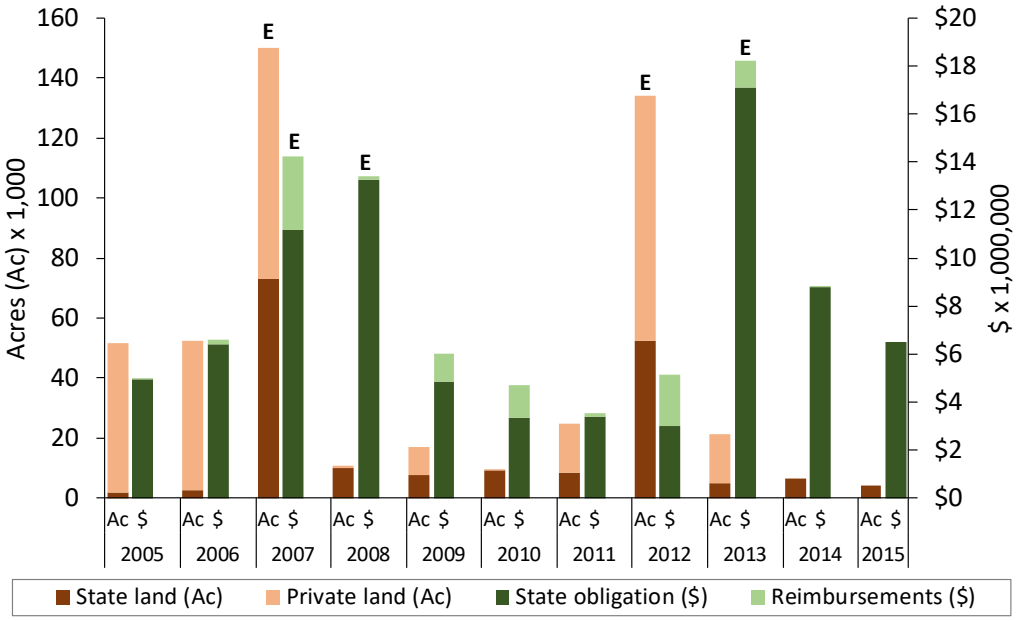
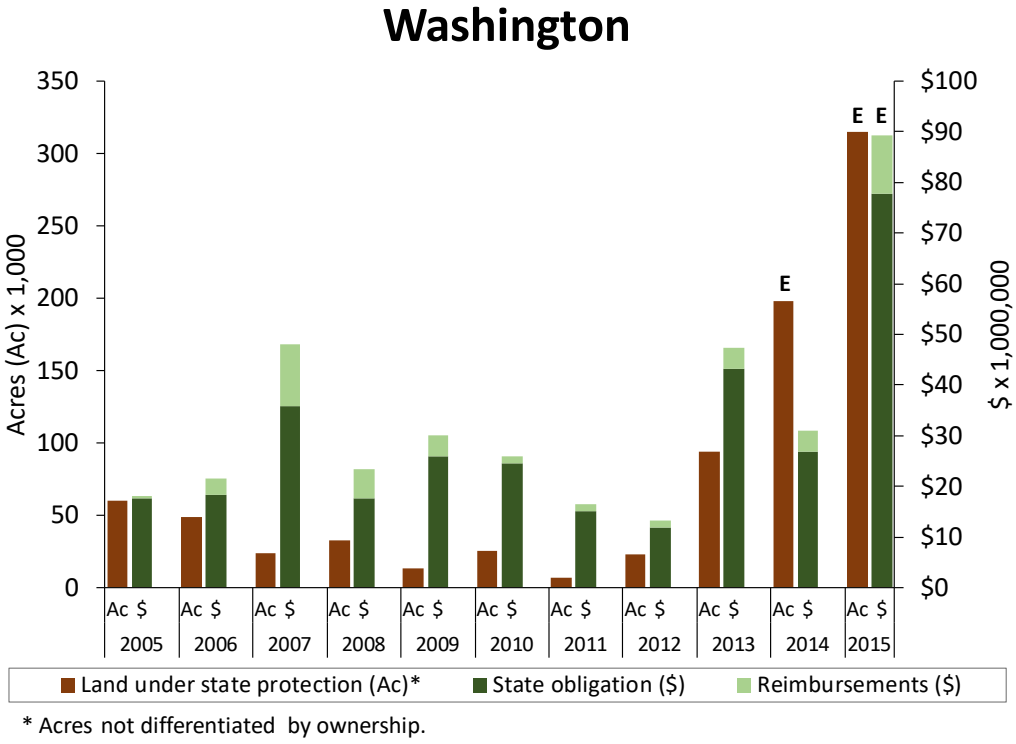


* 2007-2015 acre data from NIFC (2016a).



* Acres not differentiated by ownership.

Figure 2. continued.

Variability is a key characteristic of acres burned during the study period. Variability in acres burned each year is highlighted by identifying "extreme" fire years as those when the number of acres burned was more than one standard deviation above the mean for the study period. By this definition, every state experienced at least two extreme fire years during the 11-year study period, with California and Idaho experiencing three such years. In only one year (2010) did no state experience an extreme fire year, in four years (2005, 2008, 2009, and 2013) only one state experienced an extreme fire year, and in two years (2006 and 2011) two states experienced extreme fire years. In three years (2007, 2012, and 2014) three states experienced extreme fire years, and in 2015 five states (Alaska, California, Idaho, Oregon, and Washington) experienced extreme fire years. During the study period, California (2007 and 2008), Colorado (2011 and 2012), Idaho (2014 and 2015) and Washington (2014 and 2015) experienced back-to-back extreme fire years.

The variability of acres burned from year to year is highlighted because it is a driver of variability in wildfire suppression costs and raises policy issues related to budgeting for future years and tradeoffs with other policy priorities. Acres burned by wildfire can vary widely from year to year. For example, 11 times more acres burned in Idaho in 2007 than in 2006 (6,473 acres in 2006 versus 68,674 acres in 2007), but acres burned in 2008 (4,828 acres) were only 7% of those burned in 2007. Such swings pose challenges for planning and budgeting.

In total across the 10 states, the number of acres of state and private lands burned annually ranged from 0.6 million in 2010 and 2014 to 2.2 million acres in 2015 (**Figure 3**, brown bars). This is in addition to the number of acres of federal land burned. The average number of acres burned on only state and private lands for the 11-year period was 1.2 million, with two years (2009 and 2015) qualifying as extreme fire years.

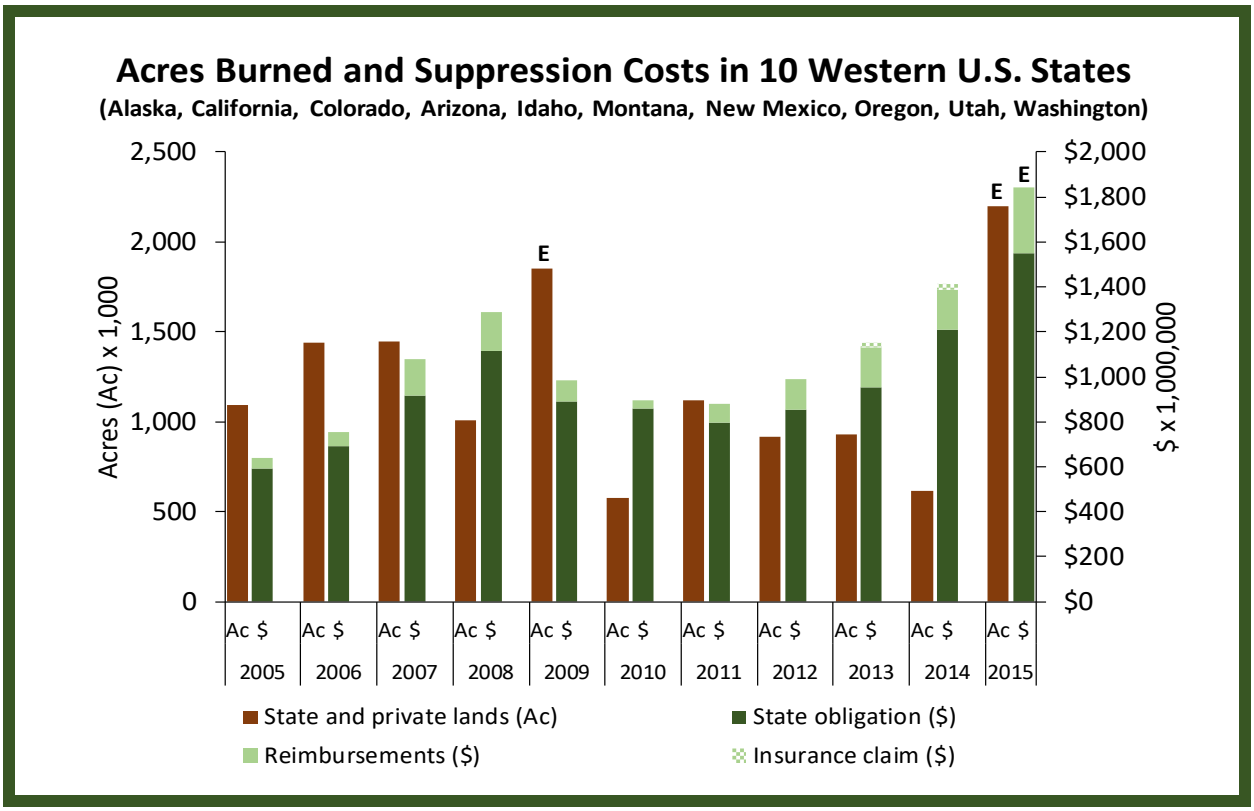


Figure 3. **Total state and private acres burned and state suppression costs (state obligation and reimbursements) for 10 western states, 2005-2015.**

Note: **E** = extreme year, defined as greater than one standard deviation above mean for study period.

Data sources: State wildfire agencies (see **Appendix A** for detail).

State Wildfire Suppression Costs

Of the 10 states that provided wildfire suppression cost data, six (California, Alaska, Idaho, Montana, Utah, Washington) provided complete data for the study period (2005-2015). Colorado was unable to provide cost data for most of the study period because responsibility for wildfire suppression shifted from the Colorado State Forest Service to the Colorado Division of Fire Prevention and Control in FY 2012. Arizona was unable to furnish cost data for 2005-2008 due to changes in its fiscal accounting system, and Oregon was unable to furnish data for 2005. Data about reimbursements from federal and other government sources were unavailable for New Mexico in 2005 and 2006, and for Arizona in 2015. States reported costs based on the fiscal year, which runs from July 1 to June 30 for each state. Summary data for each state is reported in **Appendix A**. For analysis, state wildfire suppression costs were divided into two components: suppression costs for which the state was reimbursed by the federal government or another entity, and costs the state was obligated to pay. The cost analyses below are based on nine states' responses, excluding Colorado.

Reimbursed State Costs

States receive reimbursement from a variety of sources for some of their fire suppression costs. Federal sources include cost share agreements with federal land management agencies,[1] and Fire Management Assistance Grants from the Federal Emergency Management Agency (FEMA; see **Sidebar 1**). Other agencies within a state, such as a state parks agency or county-owned forest management agency, also may reimburse a state for expenditures related to suppressing fires on lands managed by that other agency. States also participate in regional compacts, where a state wildfire agency sends resources to another state or country when they are needed, and the state is reimbursed for those expenses. Most states reported total reimbursements from all sources, not differentiated by type from federal or other sources.

Reimbursements averaged $131 million annually over the 2005-2015 study period (**Figure 3**, light green bars). Reimbursements as a percentage of total state fire suppression costs ranged from 4% in 2010 to 16% in 2015, with an average over the study period of 11%.

There was no clear pattern to reimbursements reported; larger reimbursements did not necessarily correspond to years with more acres burned. This could be for a variety of reasons. First, the proportion of fire costs paid by federal agencies through cost share agreements varies from state to state and fire to fire (see GAO 2006 and USDA Office of Inspector General 2015). Second, states are not always eligible for Fire Management Assistance Grants even when a large number of acres burn. Fires and suppression costs must meet specific criteria to be eligible for the grant program (see **Sidebar 1**). Third, reimbursements reported by the states are from a variety of sources including reimbursements for out-of-state assistance that are not reflected through in-state acreage burned numbers. Finally, reimbursement payments may extend several years after a fire and be reflected in more than one fiscal year. For example, states have up to nine months to submit their initial Fire Management Assistance Grant application after a fire has been declared eligible for the reimbursement program (FEMA 2014).

[1] USDA Forest Service Handbook 1509.11, Chapter 30, https://www.fs.fed.us/im/directives/fsh/1509.11/1509.11_30.doc.

Sidebar 1. Fire Management Assistance Grants

The federal government assists states, tribes, and local governments with wildfire suppression costs through a reimbursement grant program. While a wildfire is burning uncontrolled on nonfederal public or private forest or grassland and threatens to become a major disaster, the Governor of a state may request assistance from the Fire Management Assistance Grant (FMAG) program administered by the Federal Emergency Management Agency (FEMA). To be declared eligible for FMAG a fire or fire complex must meet four criteria:

(1) Be a threat to lives and improved property, including a threat to critical facilities/ infrastructure, and critical watershed areas;
(2) Stretch the availability of state and local firefighting resources;
(3) Occur under high fire danger conditions; and
(4) Have potential for major economic impact.

In addition, an individual declared fire or all declared and undeclared fires in a state in a year must meet a cost threshold to be eligible for FMAG. The individual fire threshold is the greater of $100,000, or a state's population times a statewide per capita indicator ($1.43 in FY2017) times 5%. The cumulative cost threshold for a state is the greater of $500,000, or 3 times the individual fire threshold.

Costs eligible for reimbursement under FMAG are broader than just suppression costs. FMAG eligible costs can include those incurred for evacuation, emergency services such as traffic control and search and rescue, and temporary repairs to damage caused by firefighting activities. FMAG requires that a state or other grantee contribute 25% of eligible costs with federal reimbursement of 75% of eligible costs.

Source: FEMA (2014).

State Wildfire Cost Obligation

A state's wildfire suppression cost obligation is equal to its overall state suppression cost minus the sum of all reimbursements; in other words, the amount of suppression costs the state is responsible for (**Figure 2**, dark green bars). Costs across the study period were examined in real dollar terms, inflating each year's dollars to 2015 using the Consumer Price Index. Total state obligations for the nine reporting states averaged $1.25 billion annually between 2005 and 2015 (**Figure 4**, dark green bars). Only in 2015 were total state obligations considered extreme (greater than the mean plus one standard deviation for the study period).

California's wildfire costs had a significant effect on overall statistics for the nine states. During the study period California's state wildfire cost obligation made up between 75% (2013) and 90% (2005, 2008, 2012), with an average of 87%, of the total state obligation for the nine states. Without California, total state obligations for the remaining nine states averaged $137 million per year for the study period.

Trends in state wildfire cost obligation over time were examined using linear regression, with year as the independent variable and state obligation in real 2015 dollars as the dependent variable. No individual state showed a significant increasing cost trend over the study period. However, the overall obligation total for all nine states showed a significant increasing trend at 4.4% annually (**Figure 4**, light blue line; R^2=0.36, p-value of year=0.05).

Similar to acreage burned by wildfire, variability is a key characteristic of state wildfire cost obligation during the study period. Variability is highlighted by identifying extreme years as those when the state's cost obligation was more than one standard deviation above the mean for the study period. By this definition, California, Montana and Utah experienced three extreme cost years during the study period, and New Mexico and Oregon experienced two extreme cost years. Alaska, Idaho, and Washington each experienced one extreme cost year during the study period. Arizona did not experience any extreme cost years, in part because its funding system provides a constant amount to pay the state's obligation.

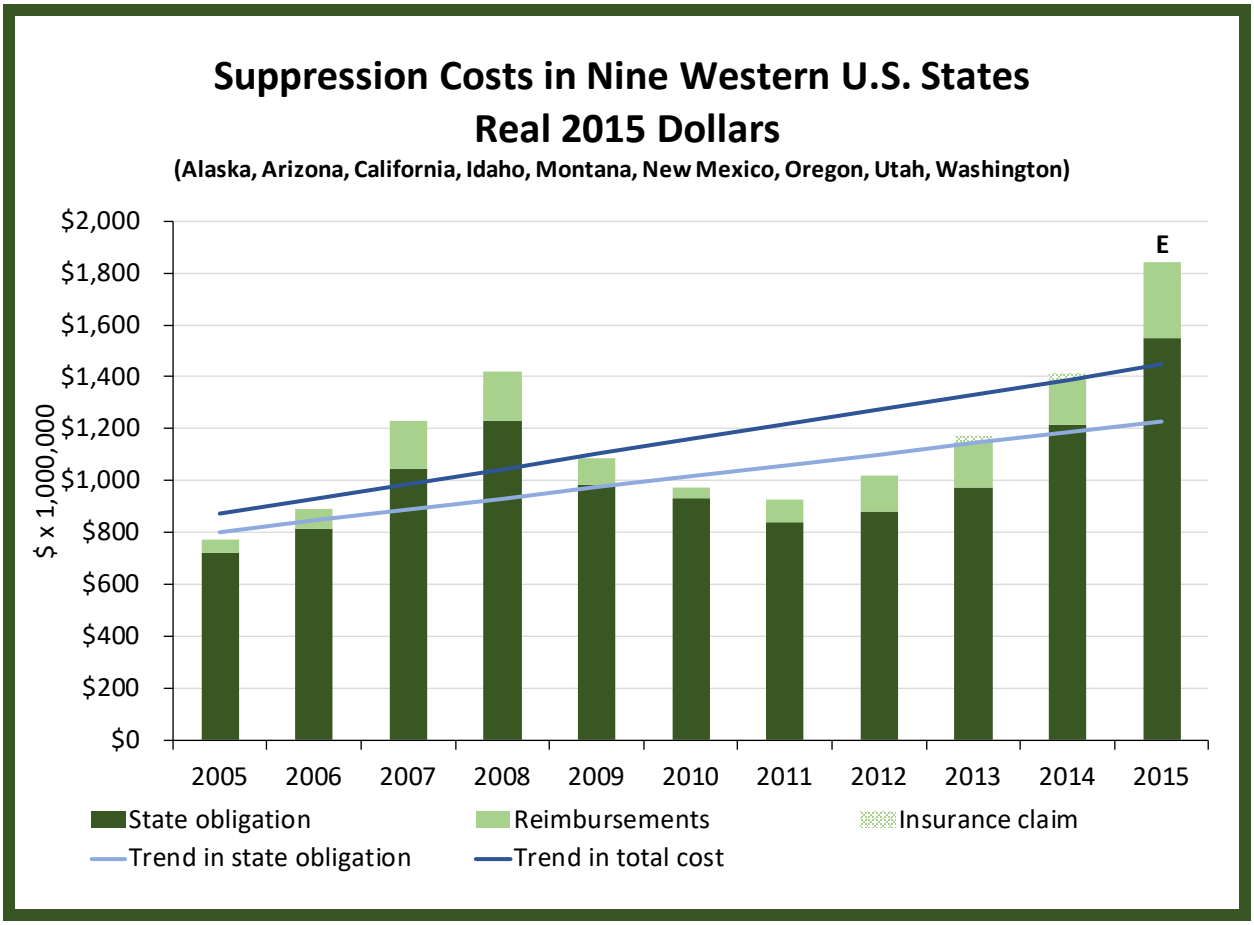


Figure 4. State wildfire suppression costs in western U.S., 2005-2015, real (2015) dollars.
Note: **E** = extreme year, defined as greater than one standard deviation above the mean for study period.
Data sources: State wildfire agencies (see **Appendix A** for detail).

Total State Suppression Cost

Total state suppression cost is the sum of all reimbursements plus the state's obligation (**Figure 2**, light green plus dark green bars). In real dollar terms, average annual cost for all nine states over the 11-year study period was $1.16 billion (**Figure 4**, light green plus dark green bars). Costs for years 2005 and 2006 were below average, followed by three years of costs slightly above average, followed by three years of below average costs. The last three years of the study period saw costs above average, with 2015 being an extreme year.

Again, California's wildfire costs have a significant effect on overall statistics for the nine states. During the study period California's total state wildfire suppression cost made up between 68% (2013) and 87% (2008, 2010, 2012), with an average of 83%, of the total state suppression costs for the nine states. Without California, total suppression costs for the remaining nine states averaged $204 million per year for the study period.

Trends in total state wildfire suppression cost over time also were examined using linear regression, with year as the independent variable and total state suppression cost as the dependent variable. Results for individual states were similar to those for the state's obligations; that is, no individual state showed a significant increasing cost trend over the study period. However, the overall suppression cost total for all nine states showed a significant increasing trend at 5.2% annually (**Figure 4**, dark blue line; R^2=0.35, p-value of year=0.05). Overall, state wildfire suppression costs in the western U.S. are increasing, but trends for individual states are not consistent.

Suppression Cost and Acres Burned

The relationship between the number of state and private acres burned and total state suppression cost also was examined using linear regression. The relationship can potentially be complicated because current wildfire costs may be paid over several years in the future. Consequently, the regression analysis used acres burned in the current year and the prior year as independent variables and total state suppression cost as the dependent variable.

Findings were inconsistent across states. For some states (Alaska, Idaho, Oregon), acres burned in the current year was a significant predictor of costs in the current year. For other states (Montana, Utah) acres burned in the prior year was a significant predictor of costs in the current year. For three states (Arizona, California, New Mexico), neither burned acres for the current or prior year was a predictor of cost. For Washington, burned acres in the current and prior year individually were significant predictors of cost, but when modeled together neither was significant. For the nine states with both acres burned and cost data, in total, acres burned was not a significant predictor of cost in the current year.

The lack of consistency across states may be a function of differences in how each state pays its suppression costs (see next section) or when those costs are paid. In addition, other research has found the cost-acreage relationship for wildfire suppression to be complex. Other factors besides fire size influence wildfire suppression costs, such as the amount of private land, the amount of housing, fuel characteristics, administrative designation (e.g., wilderness), suppression strategies, and decision making influences (e.g., media coverage) (Gebert et al. 2007, Donovan et al. 2008, Liang et al. 2008, Canton-Thompson 2009, Ingalsbee 2010, Gude et al. 2013, Hand et al. 2014, Ellison et al. 2015).

State Wildfire Suppression Funding Systems

Each of the 10 western states examined has a unique system of funding its obligation for wildfire suppression. After receiving cost data and reviewing statutes and other policies, elements of each state's funding system were categorized as a type of funding source (**Table 2**). Each type of funding source is described in more detail in the sections below, as well as how each state uses that funding source. **Appendix A** provides state-by-state program details.

General Fund Appropriations Prior to Incurring Costs (i.e., Before Fire Season)

In this report, the term General Fund is used to describe state revenues that come from a variety of sources, such as sales and income tax collections, that are not restricted or dedicated to other purposes. Although the specific sources of revenue vary between states, a state's General Fund is the primary fund for providing government services.

Seven of the 10 states (Alaska, Arizona, California, Montana, Oregon, Utah, Washington) appropriate monies from their state's General Fund prior to incurring costs for wildfire suppression during a fire season. Idaho does not normally appropriate General Funds for wildfire suppression prior to incurring costs; however, in its 2015 and 2016 sessions, the Idaho Legislature appropriated $27.0 million and $34.5 million, respectively, from the state's General Fund for wildfire suppression to be used in future years.

Alaska statute does not specify a set amount to appropriate prior to fire season, but during the study period the General Fund appropriation was $6.7 million from 2005-2011 and reduced by 0.7% from 2012-2015 to meet state budget targets.[2] Arizona's total transfers from the state's General Fund to its Fire Suppression Revolving Fund were $4.0 million each year from 2005 to 2015. California appropriates a base wildfire suppression amount, its Ground Attack fund, and the majority of its Aviation Management program funding from the state's General Fund prior to fire season.[3]

[2] Personal communication, Karlyn Herrera, Alaska Division of Forestry, email 28 October 2016.
[3] Personal communication, Tom Lutzenberger, CAL FIRE, email 24 May 2017.

Table 2. Summary of state wildfire suppression funding sources for 10 western states.

Type of funding source	AK	AZ	CA	CO	ID	MT	NM	OR	UT	WA
General Fund appropriations *prior* to incurring costs (i.e., before the fire season)	✓	✓	✓		a	✓		✓	✓	✓
General Fund appropriations *after* incurring costs (i.e., post fire season)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Landowner assessment			b		b	b		✓		✓
Insurance								✓		
Assessment on timber harvests								✓		
Revenues from unrelated activities				b					✓	
County payments				✓					✓	
Disaster response account				✓						✓
Cost recovery via legal action	*	*	✓	*	*	*	*	*	*	*

✓ = state uses type as a funding source for suppression costs.
* = supported as funding source in statute, but not reported separately by states.
a = not typically used, but Idaho Legislature did so in 2015 and 2016.
b = used to fund wildfire preparedness but not suppression.

Montana changed its funding system for wildfire suppression several times during the study period, but as of 2013 statute requires the state to use a percentage of surplus from the General Fund to fund its Fire Suppression Account prior to incurring suppression costs. If the state General Fund does not have a surplus, there is no contribution to the Fire Suppression Account.

Oregon employs a three-tiered funding system for wildfire suppression: tier one—base funding, tier two—statewide severity funding, and tier three—large fire funding. The state's General Fund contributes to two of the tiers prior to a fire season. Private forest landowners pay one-half of an assessed rate to provide base funding to forest protection districts; a General Fund appropriation replaces the other half of revenue needed for the base tier. The General Fund also pays for an insurance premium above $0.5 million that is part of large fire funding in tier three.

During the study period, Utah appropriated $1.5 million annually from the state's General Fund to the Wildland Fire Suppression Fund to pay its statutory obligation to Utah's counties—one-half of the counties' costs of wildfire suppression considered to be normal, or the average of the last seven years. Beginning in 2017, under a new funding system, the state is required by statute to appropriate $4.0 million annually from the General Fund, subject to a maximum balance for the Wildland Fire Suppression Fund of $12.0 million.

Washington also provides a base appropriation for wildfire suppression from its General Fund prior to incurring suppression costs. During the study period Washington's General Fund appropriation ranged from $8.0 million in 2012 to $19.1 million in 2014 and 2015.

General Fund Appropriations After Incurring Costs (i.e., Post Fire Season)

All states in this study use General Fund appropriations to pay wildfire suppression costs after they have occurred, with the level of funding dependent upon total suppression costs, reimbursements, and existing balances in suppression funding accounts. In Alaska, supplemental General Fund appropriations ranged from $0.1 million (2008) to $68.3 million (2015). In Arizona, post fire General Fund emergency appropriations are only used when wildfire suppression liabilities exceed $3.0 million in a year and the governor declares a "wild land fire emergency." Arizona reported no supplemental General Fund appropriations for wildfire suppression costs during the study period.

California's post-fire General Fund appropriations for its Emergency Fund ranged from $152.8 million in 2006 to $683.4 million in 2015. In addition, the portion of Aviation Management not paid pre-fire was paid from the General Fund post fire.

Colorado can use its General Fund, in addition to other sources, to replenish its Disaster Emergency Fund that is then transferred into the Wildfire Emergency Response Fund and used for the state's wildfire suppression cost obligations. General Fund appropriations also can be made directly to pay suppression costs without going through the Wildland Emergency Response Fund, as the Colorado Legislature did in FY 2012 for $608,200 in expenditures post fire.[4]

Idaho's normal method for paying wildfire suppression costs is to use "deficiency warrant authority" to pay for wildfire suppression after the costs have been incurred. In this case, costs are incurred in one year and the Idaho Department of Lands asks the Legislature the following legislative session to appropriate funds to pay those costs. General Fund appropriations to pay deficiency warrants ranged from $3.6 million (2011) to $60.2 million (2015) during the study period.

During the early part of the study period, Montana used deficit spending to fund wildfire suppression. An increase in the state's obligation from $3.0 million in 2005 to $5.1 million in 2006 to $39.7 million in 2007 prompted the state to adopt changes to its funding system, now appropriating recurring General Funds from the state's surplus prior to fire season.

New Mexico funds its entire wildfire obligation using emergency funding post fire from the General Fund. The emergency funding is accomplished via executive order. During the study period New Mexico's General Fund obligation ranged from $1.6 million in 2015 to $18.0 million in 2012.

Oregon uses its General Fund to pay up to $2.0 million (40%) of its tier two—statewide severity funding through post-fire appropriations. It also uses its General Fund to pay the amount above $10.0 million (50%) of the insurance deductible of the tier three—large fire funding not paid by pre-fire suppression appropriations from the Oregon Forest Land Protection Fund. Supplemental appropriations are also responsible for large fire suppression costs exceeding any insurance policy coverage limit, as Oregon did in 2013 and 2014.

In Utah, supplemental appropriations from the state's General Fund occurred in five of the 11 years analyzed: 2005 ($1.3 million), 2006 ($4.0 million), 2007 ($8.2 million), 2008 ($6.0 million), and 2013 ($13.5 million). In Washington, supplement General Fund appropriations ranged from none in 2012 to $54.5 million in 2015.

The effects of appropriations of General Funds for fire suppression costs both pre and post fire season on state's General Funds are examined in **Sidebar 2**.

Landowner Assessments

Landowner assessments are fees charged to owners receiving wildfire protection on their property. Oregon and Washington are the only states that use revenues generated by landowner assessments for wildfire suppression funding. California, Idaho, Montana, and Oregon use landowner assessments for wildfire preparedness funding (see specific state programs in **Appendix A**).

[4] Memo from Viktor Bojilov, Colorado Division of Fire Prevention and Control, 17 May 2017 (see **Appendix A**).

Sidebar 2. Effects of wildfire suppression costs on General Funds.

Expending General Funds on wildfire suppression costs means that those funds are not available for other state expenditures. The effects of wildfire suppression costs on General Funds were analyzed by computing the percentage of General Fund revenues that wildfire suppression costs represented for each state and year (**Figure 5**).

Over the study period, 2005-2015, for the nine states with wildfire costs data, an average of 0.43% of General Fund revenues were spent annually on wildfire suppression costs. However, as with acres burned by wildfire and suppression costs in general, variability was high between years and among states. For example, in Montana's extreme fire-cost years of 2007, 2008, and 2013, General Fund expenditures for suppression costs were 2.16%, 2.63%, and 2.75%, respectively, of General Fund revenues. Idaho's extreme fire-cost year in 2015 resulted in expenditures that were 1.97% of General Fund revenues, compared to 0.15% in 2011, a low fire-cost year.

For individual states, only California had a significant increasing trend in the percentage of General Fund revenues dedicated to wildfire suppression over the study period (R^2=0.40, p-value of year=0.04). For the nine western states in total, there also was a significant increasing trend of 4.5% annually (**Figure 5**, green-dashed line; R^2=0.51, p-value of year=0.01).

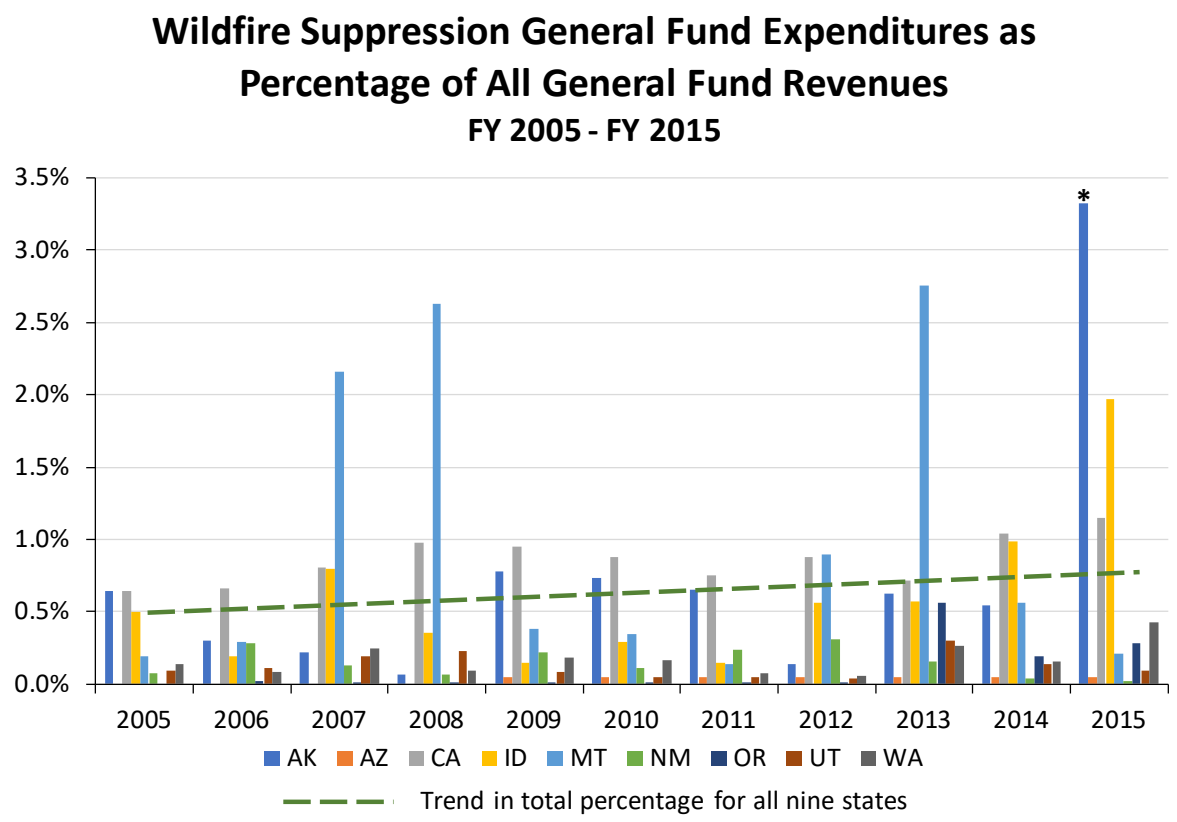


Figure 5. Wildfire suppression General Fund expenditures as percentage of all General Fund revenues, 2005-2015, by state.

*In addition to experiencing a 155% increase in suppression expenditures from 2014 to 2015, Alaska also experienced a decrease in oil-related revenues that resulted in a 57% decrease in its General Fund from 2014 to 2015.

Data sources: State wildfire agencies and NASBO (annual reports; see **Appendix B** for details).

Oregon uses landowner assessments to fund, in part, all three of its wildfire suppression tiers. All forest landowners, public and private, pay a Forest Patrol Assessment that provides base funding for forest protection districts; public forest landowners pay the full rate, while private forest landowners pay half the rate with the General Fund making up the other half. Funds from small landowners who pay the statutorily defined minimum Forest Patrol Assessment are split between the tier one base and the Oregon Forest Land Protection Fund that helps fund tier two—statewide severity funding and tier three—large fire funding program. Forest landowners in the wildland-urban interface pay an additional assessment that also helps fund the tier one base that includes both preparedness and suppression costs. An additional Fire Suppression Assessment is levied on all forest lands, which helps to fund the tier two—statewide severity funding and tier three—large fire funding program through the Oregon Forest Land Protection Fund.

Washington forest landowners pay an assessment into the Landowner Contingency Forest Fire Suppression Account that is used to pay emergency fire suppression costs. If a fire starts as a result of commercial operations by a landowner and appropriated General Funds are used for suppression, the contingency account is used to reimburse the General Fund.

Insurance

Oregon has the option to purchase insurance on the private market to fund a portion of its tier three—large fire funding program. Before February 1 of each year, the state's Emergency Fire Cost Committee and the State Forester consult about whether to buy emergency fire suppression costs insurance and the level of insurance to obtain. Considerations for the decision include: cost, coverage and deductible for the insurance; suppression funding available from the Oregon Forest Land Protection Fund; current forest conditions; long-term weather predictions; available firefighting resources; and available funds for purchasing insurance. Since 1973, Oregon has chosen to purchase insurance every year except 1976 and 1985 (**Table 3**).

An insurance policy contains three important elements: the insurance premium, the deductible, and the coverage limit. For Oregon's wildfire costs insurance program, premium costs rose from $45,000 in 1973 to $3.8 million in 2015 (nominal dollars), while deductibles rose from $325,000 to $50.0 million and coverage limits rose from $1.0 million to $25.0 million over the same time period. Claims were paid by insurance in 15 of those 43 years.

Has Oregon's insurance program been a good investment? Over the 43 years (1973-2015), Oregon paid out $61.1 million (nominal dollars) in insurance premiums and received $102.0 million in insurance claims. Using constant 2015 dollars (i.e., past spending adjusted for inflation based on the Consumer Price Index), the running total of the difference between Oregon's insurance premium (debit) and insurance claims (credit) has been positive every year, except 2000, but returned to positive with claims in 2001 and 2002 (**Figure 6**). By both measures, Oregon has come out well ahead by purchasing insurance to cover large fire suppression expenses.

Table 3. Oregon emergency fire insurance program summary.

Fire Season	Insurance Year*	Premium Cost	Insurance Deductible**	Coverage Limit	Net Emergency Fire Costs***	Insurance Claim
1973	73-74	$45,000	$325,000	$1,000,000	$853,801	$528,801
1974	74-75	$45,000	$325,000	$1,000,000	$453,331	$128,331
1975	75-76	$75,000	$500,000	$1,000,000	$299,721	$0
1976	76-77	NO COVERAGE			$304,240	
1977	77-78	$92,850	$500,000	$1,000,000	$465,503	$0
1978	78-79	$77,006	$500,000	$1,000,000	$640,372	$140,372
1979	79-80	$61,919	$500,000	$1,000,000	$1,166,147	$666,147
1980	80-81	$138,875	$1,000,000	$1,000,000	$887,888	$0
1981	81-82	$174,750	$1,000,000	$2,000,000	$3,048,422	$2,000,000
1982	82-83	$174,750	$1,000,000	$2,000,000	$237,146	$0
1983	83-84	$170,000	$1,000,000	$2,000,000	$0	$0
1984	84-85	$144,968	$1,000,000	$2,000,000	$41,360	$0
1985	85-86	NO COVERAGE			$414,723	
1986	86-87	$170,000	$3,000,000	$2,000,000	$4,217,318	$917,993
1987	87-88	$244,045	$2,000,000	$2,000,000	$19,002,716	$2,000,000
1988	88-89	$1,781,493	$2,000,000	$7,650,000	$9,600,000	$7,549,771
1989	89-90	$1,956,109	$4,000,000	$8,000,000	$5,216,613	$1,216,613
1990	90-91	$2,418,438	$7,500,000	$35,000,000	$4,511,611	$0
1991	91-92	$2,418,438	$7,500,000	$35,000,000	$3,406,772	$0
1992	92-93	$2,418,438	$7,500,000	$35,000,000	$12,850,855	$5,350,855
1993	93-94	$2,878,421	$8,000,000	$34,500,000	$1,954,271	$0
1994	94-95	$2,668,039	$8,000,000	$34,500,000	$14,669,153	$6,669,153
1995	95-96	$2,777,477	$10,000,000	$32,500,000	$3,618,209	$0
1996	96-97	$2,714,577	$10,000,000	$32,500,000	$2,410,977	$0
1997	97-98	$2,539,980	$10,000,000	$33,000,000	$36,189	$0
1998	98-99	$2,380,439	$10,000,000	$33,000,000	$666,713	$0
1999	99-00	$2,372,098	$10,000,000	$43,000,000	$3,036,044	$0
2000	00-01	$2,372,098	$10,000,000	$43,000,000	$5,780,952	$0
2001	01-02	$2,266,528	$10,000,000	$43,000,000	$14,889,423	$4,880,003
2002	02-03	$3,345,305	$10,000,000	$43,000,000	$30,001,937	$19,975,885
2003	03-04	$3,570,743	$15,000,000	$20,575,000	$9,180,727	$0
2004	04-05	$3,875,425	$15,000,000	$25,000,000	$2,017,509	$0
2005	05-06	$1,290,626	$25,000,000	$25,000,000	$13,196,716	$0
2006	06-07	$1,290,626	$25,000,000	$25,000,000	$9,238,746	$0
2007	07-08	$1,081,510	$25,000,000	$25,000,000	$14,125,366	$0
2008	08-09	$907,966	$25,000,000	$25,000,000	$9,129,075	$0
2009	09-10	$907,972	$25,000,000	$25,000,000	$5,387,719	$0
2010	10-11	$860,776	$25,000,000	$25,000,000	$5,036,777	$0
2011	11-12	$811,590	$25,000,000	$25,000,000	$2,807,534	$0
2012	12-13	$854,926	$25,000,000	$25,000,000	$5,330,065	$0
2013	13-14	$923,318	$20,000,000	$25,000,000	$74,628,615	$25,000,000
2014	14-15	$2,012,041	$20,000,000	$25,000,000	$47,605,496	$25,000,000
2015	15-16	$3,832,815	$50,000,000	$25,000,000	$29,607,814	$0
Total (nominal $)		**$61,142,375**				**$102,023,924**

* Insurance Year runs from April 1, Fiscal Year X to March 31, Fiscal Year X+1

**The amount of Emergency Fire costs the state must incur before an insurance claim is paid.

***Emergency Fire costs after reimbursements (e.g., FEMA, other federal agencies).

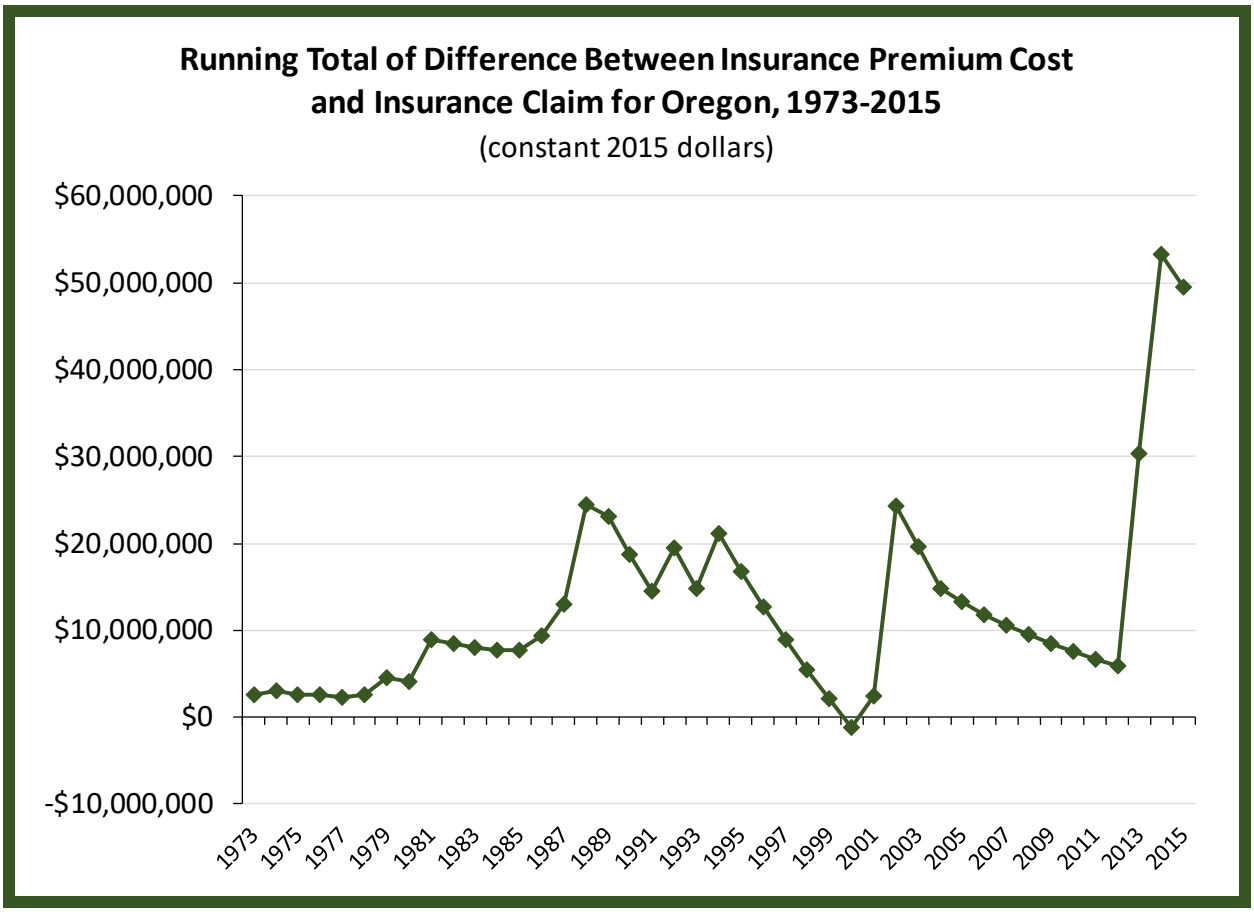


Figure 6. **Running total of difference between insurance premium cost and insurance claim, Oregon, 1973-2015, constant 2015 dollars.**

Assessment on Timber Harvest

Many states levy an assessment on the volume of timber harvested or sales of forest products to pay for services benefiting landowners or manufacturers. Oregon uses a timber harvest yield tax to fund a portion of its Oregon Forest Land Protection Fund that funds a portion of both its statewide tier two—severity funding and tier three—large fire funding. Timber harvests are assessed a yield tax of $0.625 per thousand board feet, which has annually yielded about $2.0 million dollars per year over the last decade.

Administrative rules for the Idaho Department of Lands indicate that 3.0% of funds collected on timber harvests for slash management are to be dedicated to wildfire suppression. However, the department uses those funds entirely for pre-suppression activities.[5]

Revenues from Unrelated Activities

Utah uses revenues from activities unrelated to forests, wildfire, or landownership to pay for wildfire suppression costs. Beginning in 2017 Utah will use 30% of the bonus payment it receives from federal mineral leases (Mineral Lease Bonus Account) to fund up to $2.0 million, or 20%, of the amount it expended the previous year from its Wildland Fire Suppression Account.

[5] Personal communication, Craig Foss, Idaho Department of Lands, email 10 May 2017.

In the past (FY 2013), Colorado used a portion ($0.5 million) of the state's insurance premium tax to fund the Wildfire Emergency Response Fund. Colorado also has used the insurance premium tax and the state's mineral severance tax to fund, in part, the state's Wildfire Preparedness Fund.[6]

County payments

In Utah during the 2005-2015 study period counties paid into the state Wildland Fire Suppression Fund based on the number of acres of privately-owned and county-owned land in unincorporated areas of the county, and the taxable value of property in unincorporated areas of the county. These payments totaled about $1.0 million annually. However, in 2009 the Utah Legislature had to appropriate $4.0 million from the state's General Fund to make the counties' portion of the fund solvent. As of 2017, county payments are no longer a part of Utah's funding system.

Colorado also uses a system of county payments—based on forested acreage in the county and assessed value of property in the county—to fund, in part, its Emergency Fire Fund. Moneys in the account are used to fund or reimburse emergency responses to wildfire incidents in accordance with memoranda of understanding with participating public entities. Participation by counties is voluntary, and the revenue from participating counties averages about $1.0 million per year.[7]

Disaster response accounts

Washington has a Disaster Response Account that may be used to pay wildfire suppression costs when the governor declares a state of emergency due to a wildfire. Revenues into the account come from legislative appropriations, federal appropriations, and other sources. Between 2005 and 2015, the Disaster Response Account funded a portion of the state's wildfire suppression cost obligation in eight of the 11 years, with the funding ranging between $1.1 million (2014) and $5.0 million (2006 and 2008).

Colorado also has a Disaster Emergency Fund that is the main source for funding disaster emergencies. The fund does not have a dedicated revenue source but is replenished by the Governor on an as-needed basis from various state funding streams depending on the severity of disasters requiring state funding. The majority of state responsibility costs on state fire incidents are paid from the Disaster Emergency Fund.[8]

Cost recovery via legal action

All states have laws that allow recovery of wildfire suppression costs due to negligence and civil or criminal penalties for violation of wildfire prevention laws. However, California is the only state that reported cost recoveries as a separate source of funding. During the study period, California's Civil Cost Recovery program was budgeted at $700,000 per year FY 2012 to FY 2015, regardless of actual recoveries during a year.[9] Total annual cost recovery data were not available.

DISCUSSION

States have developed funding systems for meeting their wildfire suppression cost obligations based on their own mandates, institutions, and political history. What is feasible both legally and politically in one state may not be so in another. However, if a state is considering changing its system, it is worth examining the types of mechanisms used by other states for their potential advantages and disadvantages (**Table 4**). Below are summaries of how various mechanisms fare in relation to general criteria for evaluating public finance revenue systems: ability to produce sufficient revenue, ability to deal with fluctuations in costs (i.e., need for revenue), equity, and promotion of cost control.

[6] Personal communication, Viktor Bojilov, Colorado Division of Fire Prevention and Control, 24 May 2017.
[7] Memo from Viktor Bojilov, Colorado Division of Fire Prevention and Control, 17 May 2017 (see **Appendix A**).
[8] Ibid.
[9] Personal communication, Tom Lutzenberger, CAL FIRE, email 24 May 2017.

Table 4. Summary of potential advantages and disadvantages of funding mechanisms for state wildfire suppression cost obligations.

Funding mechanism*	Potential advantages	Potential disadvantages
General Fund appropriations prior to incurring costs (i.e., before fire season)	• Reduces year-to-year fluctuations in state budget. • Reduces impact on state budget in subsequent high-cost years. • Fiscally responsible to fund expenses before incurring costs. • Reduced year-to-year political debate if amount is set in statute.	• Funding could be used for other government services when not needed for wildfire suppression (opportunity cost). • Need for prudent investment decisions of unused balances. • May encourage agency to use all funds annually.
General Fund appropriations after incurring costs (i.e., post fire season)	• Funding can be used for other government services when not needed for wildfire costs (opportunity cost). • Reflects actual costs.	• Increases year-to-year fluctuations of agency's budget as a percent of overall state budget. • May discourage cost containment strategies.
Landowner assessment	• Equitable—property owners receiving services pay part of costs. • May provide landowners with incentive to reduce wildfire risk.	• Places financial burden for public benefit on private citizens. • Unlikely to pay full costs of suppression. • Not able to distinguish between lands with varying levels of risk. • Administrative costs. • Inequitable—non-assessed landowners receive benefits without paying their share.
Insurance	• Covers catastrophic events/costs. • Reduces risk to state finances.	• Not meant for ordinary events/costs. • Potential for premium increases, higher deductibles, and lower coverage limits as suppression costs increase and claims become more frequent.
Assessment on timber harvests	• Equitable—timber owners receiving services pay part of costs.	• Not all wildfires occur on timberlands. • Not all landowners harvest timber. • Administrative costs.
Revenues from unrelated activities	• Taps fund source that provides a steady level of funding.	• Not available to all states. • Lack of incentive to manage costs.
Disaster response account	• Spreads risks and costs to state at large. • Available for catastrophic events.	• Only available for catastrophic events. • Little incentive to reduce risks or contain costs.
Cost recovery via legal action	• Party responsible for wildfire pays.	• Costly, lengthy legal action. • No guarantee of recovery. • Settlement unlikely to recover full cost. • Does not address nonhuman-caused fires.

*County payments mechanism, used in Colorado and formerly used in Utah, is not considered here because the state-county fire suppression responsibility relationship is unique.

Revenue production

Revenue production is an important attribute of any government finance system (Ross 2014), particularly if costs are expected to increase in the future. Although this study did not find definitive patterns of increasing wildfire acres burned or state wildfire suppression costs for individual states during the study period 2005-2015, the study period was a rather short timeframe. Looking over a longer time period, wildfire area has increased (e.g., Westerling et al. 2006, Dennison et al. 2014) and suppression costs for wildland firefighting have increased (e.g., NIFC 2016b). And increases in wildfire area and suppression costs are expected to continue (Brown et al. 2004, Yue et al. 2013, Liu and Wimberley 2016, Schoennagel et al. 2017). Therefore, state cost obligations for wildfire suppression likely will increase, and funding systems will need to respond to those increases.

General Fund appropriations, whether before or after suppression costs are incurred, can be responsive to increasing costs; however, using more General Funds for suppression costs means opportunities for funding other government services are foregone, especially if wildfire suppression costs increase at a rate faster than General Fund revenues grow. Analysis of revenue sources into the General Fund of each state and their growth potential was beyond the scope of this study, but to the degree a state's wildfire funding system relies on General Funds, potential for growth is important. Sources of revenue into a General Fund that show patterns of sustained growth are preferable to those that do not (Cornia and Nelson 2010, Swain and Reed 2010).

Disaster response accounts that use sources of funding similar to a state's General Fund share many of the same characteristics, advantages, and disadvantages as a General Fund. However, as their name implies, disaster response accounts are only used for extreme events and do not help fund increasing ordinary suppression costs. Prudent resource and fiscal management suggests that disaster accounts are one of the last sources to tap for funding. Also, if other types of disasters increase in the future, disaster response account funding may become less available for wildfire suppression costs.

Insurance systems also are not designed to provide regular influxes of revenue for ordinary suppression costs; they are designed for catastrophic events or unusually high-cost fire years. If wildfires and their costs increase, resulting in increasing claim amounts or more frequent claims, insurers will respond by raising premiums or reducing coverage. Insurance may become prohibitively expensive or not available at all. However, as documented in Oregon, insurance may provide a viable source of revenue that pays for itself.

In those states that use them, landowner assessments have historically provided only a portion of suppression costs, and this practice is likely to continue even with increasing costs. Assessing the full costs of suppression to landowners does not address the public benefits of suppression (see **Equity** discussion below), and likely is politically unpalatable.

Assessment of landowners also raises the issue of administrative costs of collecting revenue, an important aspect of any public funding mechanism (Ross 2014). Collection systems that differentiate between different types of property owners (e.g., forest owners inside the wildland-urban interface versus those outside) may have higher administrative costs thus reducing revenue potential. Also, administrative costs are often passed on to counties or other local units of government that collect property taxes. Assessments on timber harvests are similar in their characteristics, advantages, and disadvantages as those of landowner assessments.

Not all states have the ability to tap unrelated sources of revenue for wildfire suppression costs, such as Utah's use of federal mineral lease bonuses. Such a source is dependent on continuation of an unrelated activity, and questions about funding longevity and potential for growth are appropriate.

Fines and cost recovery via litigation have potential to raise revenue, but are dependent on the outcome of judicial proceedings and not guaranteed. Costs of legal proceedings must be weighed against expected recoveries. Delay between the time suppression costs are incurred and recovered also may be problematic. Also, litigation does not address suppression costs associated with fires not caused by humans.

Cost fluctuation

Significant annual fluctuations in state wildfire suppression cost obligations were found, and thus the need for responsive sources of revenue. The ability of a funding system to respond to fluctuations is important. To a great extent, wildfire suppression costs are demand driven rather than revenue driven. Years with more wildfire have higher suppression costs (i.e., demand); the supply of wildlife suppression activities is not directly determined by how much money is budgeted.

One response to fluctuations in costs based on fluctuating demand is to create overcapacity in an agency's budget (Rubin 2006). States that appropriate General Funds for wildfire suppression prior to fire seasons are attempting to partially mitigate the effects of fluctuating demand on the state's budget. This can have the advantage of decreasing future demand on the General Fund, but also has the disadvantage of opportunity costs associated with revenues being unavailable for other government services in the meantime. All states use General Funds post fire as a way to handle fluctuations in suppression cost obligations. Not only must state's pay their bills, they are required either constitutionally or statutorily to balance their budgets.

Disaster response accounts and insurance programs are specifically set up to handle the peaks of cost fluctuations. Disaster accounts and insurance programs only kick in when costs of wildfire events are extreme.

Assessments of landowners or on timber harvests do not appear to be appropriate ways to handle cost fluctuations. Varying assessments to respond to annual fluctuations in suppression costs would introduce uncertainty into landowners' management and financial decisions, likely be politically unacceptable, and increase administrative costs.

Using revenues from unrelated activities to deal with cost fluctuations is difficult to assess because the source of funding is unknown. Cost recovery via legal action faces many of the same challenges in relation to cost fluctuation that it does for revenue generation.

Cost fluctuation addresses only one side of the cost-revenue equation; wildfire suppression costs fluctuate and so do state revenues. What if a high-cost fire year coincides with a low-revenue year to pay those costs? Montana faces just such a situation in 2017 as wildfire suppression costs mount and state revenues lag (Associated Press 2017a and 2017b). The years of the Great Recession, 2008-2010, were relatively low-cost fire years for western states, but what if in the future a high-cost fire year coincides with a downturn in a state's economy? Are state wildfire funding systems prepared for revenue fluctuations?

One strategy for addressing revenue fluctuation is diversification of funding sources. Some state wildfire suppression funding systems use multiple sources of revenues to pay costs. For example, Oregon uses General Funds, landowner assessments, timber harvest assessments, and insurance. Although most research on revenue diversification has focused on state budgets as a whole, similar findings may apply to specific programs such as wildfire suppression funding.

The arguments for diversification include that it decreases instability of the overall revenue system and better prepares government for economic downturns and fiscal crises (Carroll 2005, 2011; Cornia and Nelson 2010). State revenue systems for wildfire suppression funding could be designed so that the likelihood of one funding source being up when another is down is increased. Use of less volatile sources of funding, where the difference between revenue peaks and valleys is reduced, also reduces the risks to a revenue stream (Cornia and Nelson 2010, NASBO 2013). For example, landowner assessments fluctuate less than timber harvest assessments because ownership is a constant characteristic of land, but timber harvest is a landowner choice that varies with economic cycles.

While diversification of revenue sources to fund wildfire suppression may enhance a system's ability to absorb cost fluctuations, increased diversification also may lead to increased complexity. Complex revenue structures tend to be less understandable and transparent to taxpayers (Oates 1991, NCSL 2016) and may result in inefficient overproduction of services (Carroll 2005, 2011).

Equity

Equity is a multi-dimensional concept when applied to public finance systems (Ross 2014), but the focus here is: are those who receive the benefit of wildfire suppression paying a fair share of the costs? Equitable public funding systems impose some of the costs upon those who benefit (NCSL 2016).

In general, states are responsible for wildfire suppression on both state-owned and private lands. To the extent that state suppression costs are incurred protecting state-owned resources, the appropriateness of using General Funds—paid by all taxpayers—is straightforward; the public is paying for a public benefit. The picture is not as clear when state suppression costs are being used to protect private resources (Busby and Albers 2010). Equity considerations suggest that private owners of those resources should pay at least some of the costs for the benefit they receive. Landowner and timber harvest assessments are two funding mechanisms that impose additional costs on those receiving the most benefit. But in those states using landowner assessments, forest landowners may bear the brunt of funding suppression activities on non-forested property, for instance grasslands.

Similarly, the cost of suppression is generally greater in the wildland-urban interface (WUI), which raises questions about equity. Protection of private structures in the WUI increases the cost of wildfire suppression (Liang et al. 2008, Headwaters Economics 2009, Gorte 2013, Gude et al. 2013). Some states impose additional fees for lands in the WUI (e.g., Oregon) or with structures on forest lands (e.g., Idaho), but others do not. Whether these fees are proportional to the additional risk these lands create or benefit provided to the landowner is a matter for policy makers to debate.

Cost control

A way to reduce the budgetary impact of wildfire suppression is to reduce costs. Two ways in which a funding system might reduce costs are briefly examined here: incentives for cost reduction by the state wildfire suppression agency, and wildfire risk reduction by the landowner.

Current wildfire suppression funding systems reflect existing laws, institutions, and political and social pressures that create incentives that influence costs (Donovan and Brown 2005, Bradshaw 2010). Economists suggest that funding suppression costs entirely post fire creates an incentive to overuse suppression resources because the opportunity cost of suppression expenditures is zero (Donovan and Brown 2005, Ingalsbee 2010, Lueck and Yoder 2016). A system that uses a base budget supplemented by a variable component that depends on the severity of a fire season, as well providing the ability to bank unused funds from low-cost years, may encourage more efficient use of wildfire suppression funds by agencies (Donovan and Brown 2005, Lueck and Yoder 2016).

Some funding mechanisms for wildfire suppression also may encourage activities that reduce wildfire risk resulting in lower suppression costs in the future. For example, Utah's current funding system requires counties and municipalities to take actions to reduce wildfire risk before they are eligible to participate in the state's funding program. In general, insurance programs tend to align incentives to invest in risk reduction to reduce premiums and limit losses in the future (Talbot and Barder 2016). Some analysts have suggested regional risk pools for insurance plans, with multiple state participation, as a way to spread risk among more entities and control costs both to states and individuals (Caohuu et al. 2015).

CONCLUSION

Western states have faced several high-cost fire years over the last decade. Expectations are that high-cost fire years will increase in cost as well as frequency in the future. Overall state expenditures for wildfire suppression over the study period support this trend. The ability of state funding systems to respond to these changes is important as variability in state obligations creates tradeoffs that affect non-wildfire policy priorities. State obligations for suppression costs averaged less than one-half percent of total General Fund revenues, but in extreme years exceeded two percent in some states causing fiscal challenges.

Each western state has developed a unique funding system for meeting its wildfire suppression cost obligations, but they have common elements. Allocation of General Funds, either pre or post fire, is the most common funding mechanism. Some states use landowner assessments either for suppression or preparedness funding so that landowners are paying for some of the benefits they receive. Oregon uses private insurance to pay for extreme costs. Utah uses unrelated revenues from federal mineral leases to pay some costs. All states have the ability to litigate to recover costs from responsible parties, but only California appears to emphasize this source of funding.

This study did not attempt to identify one state's system as better than another, but rather point out system elements that may provide indications of advantages or disadvantages to other states that are considering changes. States are policy laboratories and can learn from one another. Years with large wildfires and high suppression costs may bring funding issues to the forefront of public dialogue and policy makers' attention and present a window of opportunity for policy change within a state (Kwak 2016).

Areas for future research

This study is an initial step in understanding how states fund wildfire management and mechanisms states may use to respond to increasing wildfire and cost obligations in the future. This study looked at only one cost of wildfire management—suppression. States' policies and costs for other aspects of wildfire management—prevention and preparedness (pre-suppression)—could also be analyzed to determine how spending before fires occur affects subsequent suppression costs and what might be an efficient allocation of resources to pre-fire activities.

This study intentionally avoided examining operational policies that affect wildfire suppression costs. However, analysis of how the various state wildfire agencies approach preparedness and suppression operations may be instructive as states seek to control costs.

Analyses of state and local policies that affect land development and encourage landowners to reduce wildfire risk are also ripe for further research. Examining the costs of these policies both to private landowners and public agencies and their effects on subsequent suppression costs would assist with efficient allocation of resources. Further analysis of equity issues related to the costs public and private landowners pay for wildfire protection and the benefits they receive also is warranted.

General Funds are a source of funding wildfire suppression in every western state. As wildfire suppression costs increase or become more volatile, the ability of each state's General Fund to handle increases or fluctuations could use further examination.

The state-federal relationship for paying wildfire costs also needs further analysis, particularly in light of the potential for reduced federal budgets. Further examination of the potential for changes to cost-share agreements and the Fire Management Assistance Grants from FEMA is warranted.

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APPENDIX A. State Wildfire Acreage, Suppression Cost Data, and Funding System Information

This appendix contains annual acres burned data by ownership (state and private) and suppression cost data for 2005 to 2015 provided by the state agency responsible for wildfire suppression in each state. It also contains more detailed summaries of state wildfire suppression funding systems based on state statute, administrative rules, and other policies.

ALASKA

Through its Fire Management Program, the Alaska Division of Forestry within the Department of Natural Resources provides wildfire protection for 152 million acres of state, private, and municipal lands, almost all of the roaded area of the state and where most Alaskans live (**Figure A-1**).

The primary state funding mechanism for wildfire suppression is the Fire Suppression Fund (Alaska Statutes Sec. 41.15.210). The fund is used for actual expenses incurred in the suppression of fires. The fund may not be used for capital expenditures or to fund nonemergency activities of emergency firefighting personnel. The Alaska Legislature can appropriate money to the Fire Suppression Fund from the following sources: (1) money received in settlement of a claim or loss caused by damage as a consequence of a violation of fire protection laws or regulations, (2) money received from federal, state, or other governmental units, or from a private donor for actual fire suppression work, and (3) money received from other sources that the Legislature may consider appropriate and necessary (Alaska Statutes Sec. 41.15.220). Funding information from the Division and state budget documents indicate that appropriations to the Fire Suppression Fund typically occur through a planned appropriation and a supplemental appropriation. Sources of revenue into the fund generally include federal funds, General Funds, and "Statutorily Designated Program Receipts" that include payments from agencies that are not federal or state (e.g., local fire departments).

Table A-1 shows Alaska's state and private acres burned and state wildfire suppression costs 2005 to 2015.

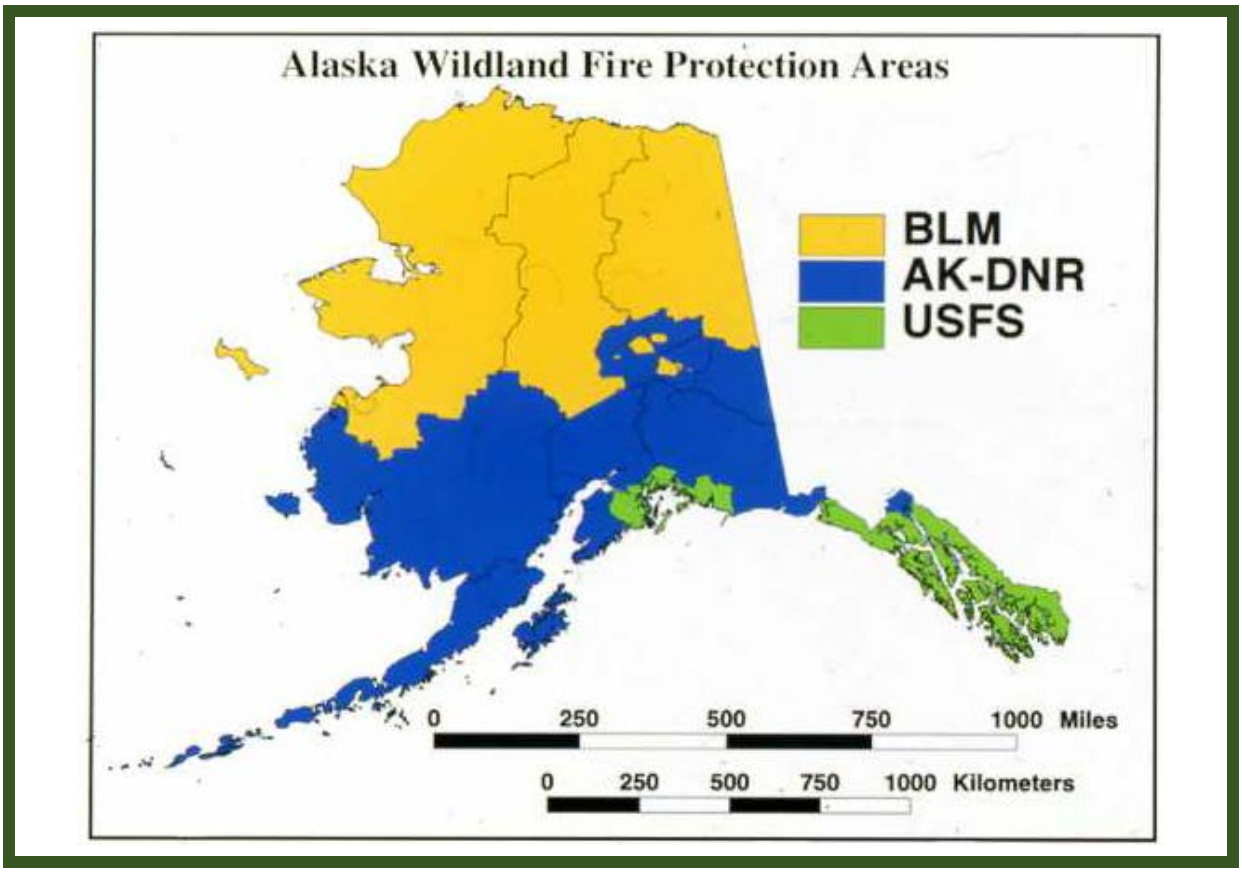

Figure A-1. Areas protected by the Alaska Department of Natural Resources, U.S. Bureau of Land Management, and U.S. Forest Service.
Source:
http://forestry.alaska.gov/Assets/uploads/DNRPublic/forestry/pdfs/overview/DOF_Orientation.ppt

Table A-1. Alaska state and private acres burned and state wildfire suppression costs, 2005-2015.

	Year										
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Acres burned											
Private (including tribal)	1,434	6,454	56,337	124	29,470	3,220	3,005	307	2,301	1,914	9,884
State	678,234	124,906	389,304	16,374	1,357,048	370,392	169,683	17,772	459,009	8,429	1,244,980
TOTAL	679,668	131,360	445,640	16,498	1,386,518	373,612	172,688	18,079	461,311	10,343	1,254,864
State suppression costs*											
Reimbursements**	$28,631,289	$14,849,100	$14,192,100	$9,459,200	$14,969,900	$9,806,600	$1,668,300	$17,334,900	$17,774,600	$23,831,400	$51,131,200
State obligation											
General Fund (base appropriation to Fire Suppression Fund prior to fire season)	$6,712,500	$6,712,500	$6,712,500	$6,712,500	$6,712,500	$6,712,500	$6,712,500	$6,663,300	$6,663,300	$6,663,300	$6,663,300
General Fund (supplemental appropriation to Fire Suppression Fund post fire season)	$13,802,273	$5,787,700	$4,503,000	$113,900	$36,897,900	$32,595,400	$43,207,900	$6,628,700	$36,695,700	$22,724,900	$68,341,000
TOTAL	$20,514,773	$12,500,200	$11,215,500	$6,826,400	$43,610,400	$39,307,900	$49,920,400	$13,292,000	$43,359,000	$29,388,200	$75,004,300
TOTAL SUPPRESSION COST	$49,146,062	$27,349,300	$25,407,600	$16,285,600	$58,580,300	$49,114,500	$51,588,700	$30,626,900	$61,133,600	$53,219,600	$126,135,500

Notes:
*Fiscal Year: July 1 - June 30.
**Includes reimbursements from federal sources as well as other states via the Northwest Compact.

ARIZONA

During the study period, 2005-2015, the Forestry Division of the Arizona State Land Department was responsible for the state's wildland fire prevention and suppression programs, and the State Land Commissioner served as the State Forester and was in charge of the programs. In 2016, the Arizona Legislature created the Arizona Department of Forestry and Fire Management, gave it fire prevention and suppression responsibilities similar to those formerly held by the State Land Department, and created a State Forester position with fire prevention and suppression duties similar to those formerly held by the State Land Commissioner (SB1189). Interestingly, SB1189 sunsets the Department on July 1, 2024. SB 1189 did not substantively change the system for funding fire suppression.

The Arizona Department of Forestry and Fire Management is responsible for fire protection and suppression on state and private lands outside of cities and towns (Arizona Revised Statutes 37-1301). The Department annually develops and implements a comprehensive plan for the deployment of resources for wildfire suppression, including state, county, municipal, fire district, volunteer fire association and private fire service providers (ARS 37-1301). The Department may provide fire suppression services on other lands covered by cooperative fire agreements (ARS 37-1303).

The Fire Suppression Revolving Fund is the main funding mechanism for fire suppression activities. The Fund consists of monies received by the State Forester for wildland fire suppression from the state's General Fund, payments for activities related to combating wildland fires, and civil penalties for use of fireworks on state lands. Monies in the Fire Suppression Revolving Fund are continuously appropriated to the Department, except that if the unobligated balance of the fund exceeds $2 million dollars at the end of any calendar year, the excess is transferred to the state General Fund (ARS 37-1305.I.). The Department cannot incur non-reimbursable liabilities for support of "nonfire all-risk activities," such as flood, earthquake, wind, and hazardous materials responses (ARS 37-1305.I).

Revenues from the General Fund into the Fire Suppression Revolving Fund total $4 million annually. One million dollars is appropriated directly by the Legislature and can be used for either pre-suppression or suppression expenses, but in reality is used mostly for suppression.[10] The remaining $3 million is requested by the State Forester from the Governor. This portion of wildland fire suppression (or other unplanned all-risk emergency) liabilities cannot exceed $3 million of the state's General Fund in a fiscal year (ARS 37-1305.D.1.). If the $3 million funding is exhausted, or if the non-reimbursable liabilities incurred exceed the cash balance of the Fire Suppression Revolving Fund, the Department cannot incur additional liabilities without the consent of a majority of the State Emergency Council (ARS 37-1305.D.2.). The State Emergency Council is made of top state elected officials and agency department heads to advise the Governor about emergency planning and response (ARS 26-304). The State Forester also may request the governor declare a "wild land fire emergency" once authorizations under the Fire Suppression Revolving Fund are exhausted, and unrestricted monies in the General Fund can be used (ARS 37-1303 and ARS 37-1305(A)).

The Department may require reimbursement from cities, other political subdivisions of the state, and state and federal agencies for costs incurred in the suppression of wildfires. The Department may require reimbursement from individuals or businesses only for costs incurred in the suppression of wildfires caused by their negligence or criminal acts (ARS 37-1305.H.). Monies received for suppressing wildfires may be used to suppress wildfires on lands protected by cooperative agreements (ARS 37-1305.F.).

The Department is also required to contribute to the state's Risk Management Revolving Fund that self-insures the state for property and liability losses and pays premiums for insurance coverage for losses not covered under the state's self-insurance program (ARS 41-621 et seq.). Although Arizona reported this contribution as a wildfire suppression expense, it is not analyzed as an expense in this study because it is not directly tied to wildfire suppression.

[10] Personal communications, Tom Vogt, Arizona Department of Forestry and Fire Management, phone call 10 May 2017.

Table A-2 shows Arizona's state and private acres burned 2005 to 2015, and state wildfire suppression costs 2009 to 2015. Suppression cost data were unavailable for 2005 to 2008.

Table A-2. Arizona state and private acres burned and state wildfire suppression costs, 2005-2015.

	Year										
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Acres burned											
Private (including tribal)	35,403	16,807	22,150	11,535	44,061	6,636	36,982	37,439	47,132	114,363	56,361
State	112,343	11,769	5,215	5,376	29,954	989	31,361	9,390	16,657	5,077	4,671
TOTAL	147,746	28,576	27,365	16,911	74,015	7,625	68,343	46,829	63,789	119,440	61,032
State suppression costs*											
Reimbursements**					$6,936,508	$5,698,203	$26,649,841	$8,158,582	$8,308,053	$3,689,263	$37,115***
State obligation****											
General Fund (appropriation to Fire Suppression Revolving Fund prior to fire season)					$4,000,000	$4,000,000	$4,000,000	$4,000,000	$4,000,000	$4,000,000	$4,000,000
TOTAL					$4,000,000	$4,000,000	$4,000,000	$4,000,000	$4,000,000	$4,000,000	$4,000,000
TOTAL SUPPRESSION COST					$10,936,508	$9,698,203	$30,649,841	$12,158,582	$12,308,053	$7,689,263	$4,037,115

Notes:

*Fiscal Year: July 1 - June 30. Data unavailable for 2005-2008.

**All reimbursements are federal.

*** Incomplete reimbursement data for 2015.

****The Arizona Department of Forestry and Fire Management also contributes to the state's Risk Management Revolving Fund. That contribution is not included here because it is not a direct wildfire suppression expense.

CALIFORNIA

The California Board of Forestry and Fire Protection oversees the state's wildfire suppression system that is implemented by the California Department of Forestry and Fire Protection (CAL FIRE; California Public Resources Code 4101 et seq.). CAL FIRE is responsible for wildfire suppression on about 31 million acres of land, almost all of which is privately owned. The area where CAL FIRE has financial responsibility for wildfire suppression is called the State Responsibility Area (SRA) and include forests, watersheds with vegetation, and rangelands contiguous to forests or watersheds (PRC 4126). The SRA does not include lands within city boundaries or federally-owned lands (PRC 4127).

Although CAL FIRE has financial responsibility for wildfire suppression on all of the SRA, CAL FIRE can contract with counties to provide fire protection services on its behalf (PRC 4129). Currently, six counties protect about 3.4 million acres of SRA through Contract County Agreements. Also, local governments can contract with CAL FIRE to provide local fire protection and emergency services outside the SRA (PRC 4142). Currently, CAL FIRE has some type of emergency services agreement with about 150 counties, cities, and fire districts.

CAL FIRE's main Fire Protection program has several sub-programs related to wildfire suppression.[11] The Fire Prevention program is responsible for implementation of the state's Strategic Fire Plan, fire engineering, law enforcement, *fire suppression cost recovery*, and fire prevention education. The Fire Control program detects, responds to, and *suppresses* wildland fires in or threatening the SRA. The Cooperative Fire Protection program administers the Contract County Agreements and the cooperative agreements with local governments. The Conservation Camps program, administered by CAL FIRE in cooperation with the Department of Corrections and Rehabilitation, operates 39 conservation camps that house 196 fire crews. The Emergency Fire Suppression program is where CAL FIRE accounts for additional emergency fire suppression expenditures beyond those budgeted for initial attack, including federal and other reimbursements.

California's General Fund pays almost all the state's obligation for wildfire suppression (**Table A-3**). General Fund appropriations occur both before and after wildfire suppression expenditures have occurred. The state also recovers a portion of wildfire suppression costs through CAL FIRE's Civil Cost Recovery program (California Health and Safety Code 13009).

State Responsibility Area Fire Prevention Fee

Although it does not fund wildfire *suppression* activities, California has a landowner assessment for residential structures on lands the state protects. In 2011, California established the State Responsibility Area Fire Prevention Fee to pay for fire prevention services within the SRA (PRC 4210 et. seq.). The fee, currently $152.33 per habitable structure, is applied annually to all habitable structures within the SRA. Owners of habitable structures that are also within the boundaries of a local fire protection agency receive a reduction of $35 per habitable structure. Fire prevention program includes activities such fuel reduction projects that lessen the risk of wildfire to communities, evacuation routes, and infrastructure. Other activities include defensible space inspections, helping communities create and update their Community Wildfire Protection Plans (CWPPs), fire prevention education, fire hazard severity mapping, implementation of the State and local fire plans, and fire-related law enforcement activities such as arson investigation.

[11] Described in annual Governor's Proposed Budget available at: http://www.ebudget.ca.gov/.

Table A-3. California state-protected acres burned and state wildfire suppression costs, 2005-2015.

	Year										
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Acres burned*											
Under state protection	75,890	206,787	412,627	404,954	80,810	27,240	52,518	61,249	127,532	103,211	316,217
State suppression costs**											
Reimbursements***	$11,662,579	$37,460,087	$102,517,764	$94,782,731	$56,401,900	$18,062,772	$49,612,212	$91,742,696	$71,466,564	$104,094,421	$157,025,926
State obligation											
General Fund (base appropriation prior to fire season)	$121,542,596	$189,350,843	$212,658,489	$264,475,641	$274,572,980	$359,146,264	$266,988,901	$180,424,401	$260,549,549	$133,485,713	$203,602,454
General Fund (surplus from prior year appropriation)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$2,926,000
General Fund (supplemental appropriation post fire season)	$190,000,000	$177,408,000	$300,816,000	$487,015,000	$271,208,000	$152,808,000	$182,128,000	$332,988,000	$192,156,000	$578,277,000	$683,407,000
General Fund (Ground Attack)	$205,499,686	$234,543,858	$241,797,310	$235,344,541	$221,723,596	$233,758,368	$234,491,887	$235,570,155	$244,721,516	$316,962,704	$336,473,624
General Fund (Aviation Management)	$14,900,718	$15,667,299	$15,700,201	$15,881,818	$16,070,424	$17,032,368	$16,663,212	$15,797,444	$16,916,935	$46,420,583	$59,650,922
Civil Cost Recovery	$0	$0	$0	$0	$0	$0	$0	$700,000	$700,000	$700,000	$700,000
TOTAL	$531,943,000	$616,970,000	$770,972,000	$1,002,717,000	$783,575,000	$762,745,000	$700,272,000	$765,480,000	$715,044,000	$1,075,846,000	$1,286,760,000
TOTAL SUPPRESSION COST	$543,605,579	$654,430,087	$873,489,764	$1,097,499,731	$839,976,900	$780,807,772	$749,884,212	$857,222,696	$786,510,564	$1,179,940,421	$1,443,785,926

Notes:

*Source: National Interagency Fire Center, Historical year-end fire statistics by state (source NICC), wildland fire acres; https://www.nifc.gov/fireInfo/fireInfo_statistics.html.

**Fiscal Year: July 1 - June 30.

***Reimbursements from federal sources.

COLORADO

During the study period (July 2012), state responsibility for wildfire suppression activities was transferred from the Colorado State Forest Service at Colorado State University to the Division of Fire Prevention and Control in the Colorado Department of Public Safety. The former agency was unable to provide financial information about the state's wildfire suppression costs. The Colorado Division of Fire Prevention and Control was able to provide a memo with some financial information, including more recent years outside the study period and a description of the state's funding system. The memo follows in its entirety (**Sidebar A-1**). The statutory references for wildfire suppression funds included in the memo are:

- Disaster Emergency Fund (Colorado Revised Statutes 24-33.5-706);
- Wildfire Emergency Response Fund (CRS 24-33.5-1226);
- Emergency Fire Fund (CRS 24-33.5-1220(2));
- Wildland Fire Cost Recovery Fund (CRS 24-33.5-1220(4));
- Wildfire Preparedness Fund (CRS 24-33.5-1227); and
- Colorado State Firefighting Air Corp Fund (CRS 24-33.5-1228(3)).

Acreage burned estimates include state and county ownerships as reported by NIFC (2016a) (**Table A-4**).

Sidebar A-1. Memo from Colorado Division of Fire Prevention and Control.

COLORADO
Department of Public Safety

Wildland Fire Suppression Funding in Colorado
Viktor Bojilov, Budget Officer
May 17, 2017

Colorado Wildland Fire Suppression State Funding Resources

The State of Colorado uses several funds to manage fire expenses for state and non-state responsibility fires. A brief description of the use of the fund is listed below.

- **Disaster Emergency Fund** – The Disaster Emergency Fund (DEF) is the Governor's main fund for funding disaster emergencies in the State. The better part of state responsibility costs on state fire incidents are paid from the Disaster Emergency Fund. The DEF currently does not have a dedicated funding source but is replenished by the Governor on an as-needed basis from various state funding streams depending on the severity of disasters requiring state funding.
- **Wildfire Emergency Response Fund** – This fund does not have a regular source of revenue and can be replenished by transfers from the Disaster Emergency Fund, direct appropriations from the General Assembly, or other direct transfers of funds by special legislation. At a minimum, the fund may be used for: (a) the first aerial tanker flight or the first hour of a firefighting helicopter to a wildfire at the request of any county sheriff, municipal fire department, or fire protection district; and (b) the employment of wildfire hand crews to fight a wildfire for the first two days of a wildfire at the request of any county sheriff, municipal fire department, or fire protection district. From time to time, the Governor and General Assembly have replenished this fund with transfers or direct appropriations into the fund. In FY 2012-13, the General Assembly provided a direct appropriation of $608,200 General Fund (not into the WERF!) for the payment of expenses from the 2012 fire season that had qualified for WERF funding. In addition, in FY 2013-14, Senate Bill 13-270 made a one-time transfer of $500,000 from insurance premium taxes into the WERF.
- **Emergency Fire Fund** – In recent years, this fund has received approximately $1.0 million in annual revenues from contributing counties. The moneys are to be used to fund or reimburse emergency responses on wildfire incidents in accordance with memoranda of understanding with participating public entities. This fund helps support a program through which counties voluntarily pay a fee (based on the assessed value of property in the county and the forested acreage in the county) that is credited to the fund. Contributing counties are eligible to receive state funding from the DEF and other state funds when a fire transitions from local control to state responsibility. In addition, certain other non-county public entities have contributed to the fund through a memoranda of understanding, contributions from these entities have been less than $50,000 per year.
- **Wildland Fire Cost Recovery Fund** – This fund does not receive any direct revenues for the payment of costs on fires, but instead allows the State to act as a central clearing house for Colorado cooperators as well as federal and local agencies for expenses on non-state responsibility fires.

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Sidebar A-1. continued.

Utilizing this fund, the Division is able to review and pay fire cost bills to multiple Colorado cooperators and jurisdictions, reconcile total costs on specific fires, and then submit for reimbursement for said costs from the responsible jurisdictions on each fire incident with participation from Colorado cooperators.

- **Wildfire preparedness fund** – This fund received an annual transfer of $4,150,000 from insurance premium taxes. The fund is currently used to pay for personal services and operating expenses in the Wildland Fire Management Section within the Division of Fire Prevention and Control. The Division of Fire Prevention and Control is the lead state agency for wildland fire suppression activities at the State level in Colorado.
- **General Fund** – Starting with State fiscal year 2014-15, the Colorado General Assembly provided General Fund dollars for the creation of a Colorado State Firefighting Air Corps. The funding provided for the purchase of two multi-mission fixed wing aircraft (MMA), the contracting for single engine air tankers (SEAT), and helicopters (Heli), as well as funding for additional State firefighting personnel. The on-going funding of the program is currently set at approximately $8.9 million for FY 2016-17 and FY 2017-18. Of the budget, approximately $6.5 million is currently dedicated to supporting operations, maintenance, and flight time of the MMA aircraft, as well as to be able to contract for SEATs and Helicopters that can be used to augment suppression activities on wildland fires.
    - Colorado's Multi-Mission Aircraft (MMA) program is comprised of two Pilatus PC-12 airplanes outfitted with state-of-the-art infrared (IR) and color sensors (EO) operated by sensor operators from the Division of Fire Prevention and Control Wildland Fire Management Staff. The PC-12 is a high performance turbo-prop aircraft that can cruise and work safely at altitudes above 20,000 feet. The primary mission of the program is detection in addition to providing near real time information to ground forces during initial attack on wildfires. Incident Commanders can order these aircraft to detect and recon wildland fires and aid them in making sound tactical decisions, improving the safety and efficiency of the response.

ANALYSIS:

Prior to FY 2012-13, the Colorado State Forest Service, within Colorado State University (CSU) was the lead agency for state wildland fire suppression activities and cooperator reimbursement, and the Governor's Office managed funding for wildland suppression. Starting with State fiscal year 2012-13, state wildland fire suppression activities and management of state expenditures were centralized into the Department of Public Safety, Division of Fire Prevention and Control. As a result, it is difficult to provide funding information for wildland fire suppression activities prior to FY 2012-13.

In addition, as the description of state funding resources for wildland fire suppression activities shows, the State of Colorado has limited dedicated wildland fire suppression funding, with the funding mechanism allowing the Governor to provide necessary funding for wildland fire suppression on an as-needed basis from various state funding streams depending on the severity of disasters requiring state funding. Thus, it is difficult to provide average state funding for suppression activities on Colorado State-responsibility wildland fires.

2

Sidebar A-1. continued.

Comparison of Significant Incident Summaries for Rocky Mountain Area Coordination Center GACC Incidents (SIT-209) vs. Internal Colorado State Responsibility Fire Cost Share Tracking

Instead of providing total state wildfire suppression spending, this memo provides a comparison of total significant wildfire incident costs reported for Colorado through the Rocky Mountain Area Coordination Center SIT-209 reports and internal Colorado financial tracking of costs share for wildland fire suppression costs on fires that transitioned to State responsibility fires.

The attached SIT-209 spreadsheet report provides a summary of significant wildland fire activities as reported through the SIT-209 reporting system for calendar years 2002 through 2016. The report shows estimated costs totaling $453.8 million. The remainder of this report will compare 2012 through 2016 fire costs reported on the SIT-209 to internal Colorado cost share tracking numbers.

2012 and 2013 fire seasons were "above average" fire seasons for Colorado. SIT-209 reports show estimated costs on significant wildland fires for both years totaling $161.3 million. Of the fires reported, a total of 26 fires became "State Responsibility" fires, which meant that the State of Colorado tracked all costs related to each State Responsibility fire. In 2012 and 2013, State records show that suppression activity for the 26 State Responsibility fires cost a total of $96.8 million. Of the 26 State Responsibility fires, 8 qualified for FEMA-FMAG grant assistance. After accounting for FMAG reimbursements, the State of Colorado ended up covering $13.6 million and the federal government covered $82.4 million of total suppression costs.

Estimated Fire Suppression Costs for Select State Responsibility Fires - Calendar Year 2012 and 2013					
Year	Cost Share Description	State Share	Federal Share	Local Share	Total Costs
2012	State Responsibility Wildland Fires	27,646,093	29,461,166	784,468	**57,891,726**
2012	FMAG Reimbursements	(19,739,667)	19,739,667	-	-
2012	**Total Estimated Costs by Jurisdiction**	**$7,906,426**	**$49,200,833**	**$784,468**	**$57,891,726**
	% Cost Share Pre-FMAG	*47.8%*	*50.9%*	*1.4%*	*100.0%*
	% Cost Share Post-FMAG	*13.7%*	*85.0%*	*1.4%*	*100.0%*
2013	State Responsibility Fires	24,015,535	14,855,074	27,246	**38,897,855**
2013	FMAG Reimbursements	(18,349,479)	18,349,479	-	-
2013	**Estimated Costs by Jurisdiction**	**$5,666,056**	**$33,204,553**	**$27,246**	**$38,897,855**
	% Cost Share Pre-FMAG	*61.7%*	*38.2%*	*0.1%*	*100.0%*
	% Cost Share Post-FMAG	*14.6%*	*85.4%*	*0.1%*	*100.0%*
2012-2013	State Responsibility Fires	51,661,628	44,316,240	811,713	**96,789,581**
2012-2013	FMAG Reimbursements	(38,089,146)	38,089,146	-	-
2012-2013	**Estimated Costs by Jurisdiction**	**$13,572,482**	**$82,405,386**	**$811,713**	**$96,789,581**
	% Cost Share Pre-FMAG	*53.4%*	*45.8%*	*0.8%*	*100.0%*
	% Cost Share Post-FMAG	*14.0%*	*85.1%*	*0.8%*	*100.0%*

2014 and 2015 fire seasons were "below average" fire seasons for Colorado. SIT-209 reports show estimated costs on significant wildland fires for both years totaling $5.1 million. Of the fires reported, a

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Sidebar A-1. continued.

total of 1 fire (2014) became a "State Responsibility" fire, which meant that the State of Colorado tracked all costs related to that fire. In 2014 and 2015, State records show that suppression activity for the 1 State Responsibility fire cost a total of $82,116. The State of Colorado ended up covering $54,016 and the federal government covered $28,100 of total suppression costs.

Estimated Fire Suppression Costs for Select State Responsibility Fires - Calendar Year 2014					
Year	Cost Share Description	State Share	Federal Share	Local Share	Total Costs
2014	State Responsibility Wildland Fires	54,016	28,100	-	**82,116**
2014	FMAG Reimbursements	-	-	-	-
2014	**Total Estimated Costs by Jurisdiction**	**$54,016**	**$28,100**	**$0**	**$82,116**
	% Cost Share Pre-FMAG	*65.8%*	*34.2%*	*0.0%*	*100.0%*
	% Cost Share Post-FMAG	*65.8%*	*34.2%*	*0.0%*	*100.0%*

The 2016 fire season was "above average" fire season for Colorado. Please note that State cost share tracking for 2016 fires is not complete, as such, cost share estimates for 2016 State Responsibility fires are preliminary. SIT-209 reports show estimated costs on significant wildland fires for 2016 totaling $54.1 million (Please note that there is an error in the SIT-209 report with the cost estimate for the Junkins Fire, the SIT-209 report shows $18,403 in estimated costs, staff is aware that the current estimate of total suppression costs on the Junkins Fire to be closer to $13.5 million. With the Junkins estimate, total SIT-209 estimated costs will be closer to $67.5 million). Of the fires reported, a total of 6 fires became "State Responsibility" fires, which meant that the State of Colorado tracked all costs related to each State Responsibility fire. State preliminary estimates show that suppression activity for the 6 State Responsibility fires could total $54.7 million. Of the 6 State Responsibility fires, 3 qualified for FEMA-FMAG grant assistance. After accounting for FMAG reimbursements, the State of Colorado could end up covering $8.0 million and the federal government could end up covering $46.2 million of total suppression costs.

PRELIMINARY Estimated Fire Suppression Costs for Select State Responsibility Fires - Calendar Year 2016					
Year	Cost Share Description	State Share	Federal Share	Local Share	Total Costs
2016	State Responsibility Wildland Fires	15,025,000	39,216,000	500,000	**54,741,000**
2016	FMAG Reimbursements	(7,000,000)	7,000,000	-	-
2016	**Total Estimated Costs by Jurisdiction**	**$8,025,000**	**$46,216,000**	**$500,000**	**$54,741,000**
	% Cost Share Pre-FMAG	*27.4%*	*71.6%*	*0.9%*	*100.0%*
	% Cost Share Post-FMAG	*14.7%*	*84.4%*	*0.9%*	*100.0%*

4

Table A-4. Colorado acres burned, 2005-2015.

	Year										
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Acres burned											
State and county*	6,195	81,313	12,539	70,022	17,815	24,515	98,239	109,271	33,408	15,356	15,999
TOTAL	6,195	81,313	12,539	70,022	17,815	24,515	98,239	109,271	33,408	15,356	15,999

Notes:
*State and County acres as reported in NIFC (2016a).

IDAHO

The Idaho Department of Lands (IDL) is the state agency responsible for wildfire protection in Idaho (Idaho Code 38-102). Idaho is divided into 16 forest protective districts (Idaho Code 38-110). Two of the districts cover lands protected by the USDA Forest Service and US Bureau of Land Management, two are protected by Tribes, 10 are protected directly by IDL, and two are protected by non-profit timber protective associations on behalf of the state (Idaho Code 38-104A).

Due to the scattered nature of ownership in Idaho, some state and private lands are located in federal protection areas, while some federal lands are included in state protection areas. These are known as "offset acres." Forest protective districts where IDL has protection responsibilities include about 867,000 acres of forested federal lands (IDL 2016). In exchange, federal agencies protect about 864,000 acres of forested private and state lands.

Fire protection costs in Idaho are divided into of two parts: preparedness and suppression. Both parts are paid through the Forest Protection Fund (Idaho Code 38-129). Revenues into the Forest Protection Fund include general tax revenues, landowner assessments for preparedness (see next section), cost recoveries from people who start wildfires (Idaho Code 38-107), and federal funds for forest fire protection.

State fire suppression costs are incurred when IDL dispatches personnel and equipment to a fire. Payment for suppression resources while assigned to a fire is made from the Forest Protection Fund through deficiency warrant authority (deficit spending) granted by the Legislature to the State Board of Land Commissioners (Idaho Code 38-131). When the Idaho Legislature convenes in January it reviews the suppression bills incurred during the previous fire season and appropriates moneys from the state's General Fund to reimburse the Forest Protection Fund for the deficiency warrants.

Table A-5 shows acres burned under Idaho's protection and state wildfire suppression costs 2005 to 2015.

Preparedness Funding

Preparedness for wildfires involves providing resources to be ready in advance of an actual fire. Preparedness in areas of the state where IDL or one of the timber protective associations has direct protection responsibility is funded through the Forest Protection Fund (Idaho Code 38-129). For forest landowners who own 26 acres or more, the forest protection district assessment for the Forest Protection Fund cannot exceed $0.65 an acre per year.[12] For forest landowners whose total acres of forest lands are 25 acres or fewer, the minimum assessment per year is equal to the per acre cost multiplied by 25. In addition, a surcharge not exceeding $40 is assessed for each improved lot or parcel to offset costs associated with wildfire preparedness (Idaho Code 38-311).[13] Actual rates during our study period (2005-2015) were $0.45 per acre and $10 per improved parcel in 2005, $0.55 per acre and $20 per improved parcel from 2006 to 2008, and $0.60 per acre and $40 per improved parcel from 2009 to 2015. The state is assessed the same rate for its lands that private landowners are, but can use deficiency warrants to pay its share (Idaho Code 38-114).

Rangeland Fire Protection

The state of Idaho does not have direct wildfire suppression responsibility on rangelands. Under agreement, if a fire starts on rangeland owned by the state of Idaho and is suppressed by the US Bureau of Land Management (BLM), then IDL will pay the suppression costs (IDL 2015). If a fire starts on rangeland owned by the state of Idaho and spreads to another ownership, then IDL will pay a pro-rata share of BLM's suppression costs. IDL does not share in suppression costs when a fire starts on another ownership and spreads onto rangeland owned by the state of Idaho. If a fire starts on privately owned

[12] The Legislature in 2009 (HB31) raised the forest land assessment limit to $0.65 per acre from $0.60.
[13] The Legislature in 2009 (HB31) raised the improvement assessment limit from $20 per parcel to $40.

rangelands, then the responding agency—BLM, rangeland fire protection association, rural fire district, or USDA Forest Service—is responsible for its own suppression costs.

In 2013, statutory changes allowed rangeland owners to work with IDL to establish nonprofit rangeland fire protection associations to enter into agreements for fire suppression on rangelands (Idaho Code 38-104B). IDL documents and tracks firefighter training for the associations and facilitates equipment acquisition. As of 2016, there are eight rangeland fire protection associations in southern Idaho with 250 members protecting 7.7 million acres.[14]

[14] https://www.idl.idaho.gov/fire/rfpa/index.html

Table A-5. Idaho acres burned under state protection and state wildfire suppression costs, 2005-2015.

	Year										
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Acres burned											
Under state protection*	10,868	6,473	68,674	4,828	457	3,465	1,016	4,755	7,208	82,526	78,571
TOTAL	10,868	6,473	68,674	4,828	457	3,465	1,016	4,755	7,208	82,526	78,571
State suppression costs**											
Reimbursements	$2,557,000	$3,463,000	$6,249,000	$2,309,000	$1,120,000	$1,334,000	$4,239,000	$7,813,000	$8,455,000	$3,980,000	$17,902,000
State obligation											
General Fund (deficiency warrant appropriation to Forest Protection Fund post fire season)	$11,320,000	$4,760,000	$22,442,000	$10,341,000	$3,623,000	$6,673,000	$3,589,000	$14,491,000	$15,621,000	$27,681,000	$60,211,000
TOTAL	$11,320,000	$4,760,000	$22,442,000	$10,341,000	$3,623,000	$6,673,000	$3,589,000	$14,491,000	$15,621,000	$27,681,000	$60,211,000
TOTAL SUPPRESSION COST	$13,877,000	$8,223,000	$28,691,000	$12,650,000	$4,743,000	$8,007,000	$7,828,000	$22,304,000	$24,076,000	$31,661,000	$78,113,000

Notes:
*Not differentiated by ownership. Includes state and private land and federal offset acres.
**Fiscal Year: July 1 - June 30.

MONTANA

The Montana Department of Natural Resources and Conservation (DNRC) through its Fire and Aviation Management Bureau of the Forestry Division is the state fire protection agency. All wildlands in Montana have some form of fire protection. Wildlands are areas "in which development is essentially nonexistent, except for roads, railroads, powerlines, and similar facilities, and in which structures, if any, are widely scattered" (Montana Code Annotated 76-13-102).

Through the Fire Suppression Program, DNRC provides direct protection to 5.2 million acres—3.5 million acres of state and private lands and 1.7 million acres of federal public lands. DNRC assists all 56 cooperating counties and a network of 400 fire departments statewide when fires exceed their capabilities on 45.3 million acres of state and private lands. DNRC also subcontracts fire protection on 1.7 million acres of state and private lands to the USDA Forest Service, US Bureau of Land Management, US Fish and Wildlife Service and the Bureau of Indian Affairs and the Salish and Kootenai Tribes within the Flathead Reservation.[15]

Montana's wildfire suppression funding program experienced several changes during the study period 2005-2015. Prior to 2007, Montana funded wildfire suppression through deficit spending, where DNRC borrowed funding from other programs until the next biennial legislative session when the Legislature would appropriate funding for past suppression costs.[16]

In September 2007, a special session of the Montana Legislature created the Fire Suppression Account (HB3; MCA 76-13-150). Through the act, the Legislature appropriated $40 million from the state's General Fund to the Fire Suppression Account. In future years, the balance of the fund was to be at least $40 million, with any deficit to come from the state's General Fund. In addition to General Fund revenue, the account also received funding from restitution by private parties and interest on the account. The Legislature also could appropriate other money to the account. The account was a "statutorily appropriated" account, meaning that the level of spending was authorized without need for a biennial legislative appropriation. The account could only be used for fire suppression activities. HB3 also called for the act's provisions to be terminated at the end of FY 2009.

In 2009, the Legislature amended the Fire Suppression Account statute (HB154; MCA 76-13-150). The provision requiring a $40 million minimum balance was removed. The purposes of the account were expanded to include fuel mitigation and grants to county cooperatives for fire suppression equipment. The provision making the Fire Suppression Account a statutorily-appropriated account also was removed, and Legislature authorized payment of FY 2008 fire suppression expenditures from the account as well as up to $30 million in expenditures for the 2011 biennium. The Legislature also specified that if more than $15 million remained unspent in the account on May 1, 2010, the DNRC could spend no more than $2 million on fire prevention, fuel mitigation, and equipment grants to counties. HB154 also repealed the sunset provision of 2007's HB3. In 2011, the Legislature added a provision that it could transfer funds out of the Fire Suppression Account (HB604; MCA 76-13-150).

In 2013, the Legislature revamped the funding mechanism for the Fire Suppression Account (HB354; MCA 76-13-150). At the end of each fiscal year, if the state's General Fund surplus is greater than 0.5% of its total appropriations for the year, the excess is transferred to the Fire Suppression Account, subject to a $100 million cap on the fund.[17] For Fiscal Years 2013, 2014, and 2015, HB354 transferred funds in excess of $152 million, $156.2 million, and $157.5 million, respectively, from collections of Montana's corporate income (license) tax to the Fire Suppression Account. In addition, uses of the Fire Suppression Account were expanded to include fuel reduction and forest restoration, and a cap of $5 million per

[15] http://dnrc.mt.gov/divisions/forestry/fire-and-aviation/wildland-fire-supression.

[16] Personal communications, Sue Clark, Montana Dept. of Natural Resources and Conservation, phone call, 26 October 2016.

[17] In 2017, the Montana Legislature revised the cap to 4% of all general fund appropriations in the second year of a biennium (SB261).

biennium was set for fuel reduction, mitigation, and forest restoration spending (HB354; MCA 76-13-150). HB354 also re-established the Fire Suppression Account as a statutorily-appropriated account.

Table A-6 shows Montana's state and private acres burned and state wildfire suppression costs 2005 to 2015.

Preparedness Funding

Montana has a Wildland Fire Protection program that is funded by landowners and the state's General Fund through a state special revenue fund (MCA 76-13-207). The total of all landowner assessments cannot be more than one-third the total amount the Legislature appropriates for the Wildland Fire Protection program (MCA 76-13-207). The fund historically has not been used to fund suppression activities, although statutory amendments in 2007 (SB 145) added suppression as a potential use of the fund.[18]

Prior to 2007, the landowner Wildland Fire Protection assessment was $30 for each landowner in a protection district plus not more than an additional $0.20 per acre for each acre over 20. In 2007, the landowner fire protection assessment was raised to $45 for each landowner plus not more than $0.25 per acre for each acre over 20 (SB145). In addition, the allocation of the assessment was statutorily set so that landowners with 20 acres or less were assessed 60% of total fee collection, and landowners with more than 20 acres were assessed 40% of total fee collection (MCA 76-13-213). In 2009, a condominium provision was added through which a person who has partial ownership of the property and full ownership of a unit on the property is assessed 50% of one of the above rates (SB143). In 2015, the landowner Wildland Fire Protection assessment was raised to $50 for each landowner plus not more than $0.30 per acre for each acre over 20 (SB47).

[18] http://leg.mt.gov/content/committees/interim/2007_2008/fire_suppression/meeting_documents/Fire%20Protection%20Fee%20Feb%202008%20_2_.pdf and personal communications, Sue Clark, Montana Dept. of Natural Resources and Conservation, phone call, 26 October 2016.

Table A-6. Montana state and private acres burned and state wildfire suppression costs, 2005-2015.

	Year										
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Acres burned											
Private (including tribal)	13,588	421,266	99,617	121,219	5,846	23,775	23,775	455,503	2,183	12,477	51,276
State	2,171	25,881	49,153	5,615	484	3,059	3,059	19,082	10,808	1,796	2,722
TOTAL	15,759	447,147	148,770	126,834	6,330	26,834	26,834	474,585	12,991	14,273	53,998
State suppression costs*											
Reimbursements	$989,945	$3,240,042	$21,290,928	$56,757,219	$3,211,351	$1,047,748	$807,571	$3,596,721	$14,000,275	$8,038,987	$2,785,577
State obligation**											
General Fund (deficit spending)	$2,979,151	$5,062,270	$39,709,390***								
General Fund (Fire Suppression Account)****				$51,395,318	$6,871,534	$5,647,966	$2,485,775	$16,760,382	$57,224,701	$11,619,845	$4,638,965
TOTAL	$2,979,151	$5,062,270	$39,709,390	$51,395,318	$6,871,534	$5,647,966	$2,485,775	$16,760,382	$57,224,701	$11,619,845	$4,638,965
TOTAL SUPPRESSION COST	$3,969,096	$8,302,312	$61,000,318	$108,152,537	$10,082,885	$6,695,714	$3,293,346	$20,357,103	$71,224,976	$19,658,832	$7,424,542

Notes:

*Fiscal Year: July 1 - June 30.

**Includes reimbursements from federal sources as well as other state agencies.

***In September 2007 a special session of the Montana Legislature created and funded the Fire Suppression Account to address this and future obligations.

****Sources of revenue for the General Fund transferred to the Fire Suppression Account have varied. For 2007-2012, the appropriation was made from the General Fund without regard to source. For the Fiscal Years 2013, 2014, and 2015, transferred funds were specified to come from collections of Montana's corporate income (license) tax in excess of $152 million, $156.2 million, and $157.5 million, respectively.

NEW MEXICO

The Forestry Division of the New Mexico Department of Energy, Minerals and Natural Resources is the state agency responsible for wildfire suppression. The state has responsibility for prevention and suppression of forest fires on all nonfederal, non-municipal lands in the state (New Mexico Statutes Annotated 68-2-8). A "forest fire" means a fire burning uncontrolled on lands covered wholly or in part by timber, brush, grass, grain or other inflammable vegetation (NMSA 68-2-7).

The state can cooperate with federal, state and local agencies in the development of systems and methods for wildfire suppression on rural lands and within rural communities, and provide financial, technical and related wildfire suppression assistance to other organizations, train and equip local fire-fighting forces to suppress fires threatening the natural resources of rural forest areas (NMSA 68-2-8). The Division is authorized to enter into contracts and cooperative agreements with the U.S. Forest Service, private landowners, the New Mexico Commissioner of Public Lands, individuals, corporations or other state, federal and private agencies or organizations to prevent and suppress forest fires, brush fires, grass fires or other wild fires (NMSA 68-2-6).

The state of New Mexico provides funding for wildfire suppression from the state's General Fund when the resources required are beyond those locally available and the Governor declares an emergency (NMSA 12-11-23 to 12-11-25). The emergency funding is accomplished via Executive Order after wildfire suppression expenses have been incurred.

Table A-7 shows New Mexico's state and private acres burned and state wildfire suppression costs 2005 to 2015.

Table A-7. New Mexico state and private acres burned and state wildfire suppression costs, 2005-2015.

	Year										
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Acres burned											
Private (including tribal)	28,776	345,361	99,726	245,532	195,680	61,894	523,907	25,540	5,714	8,465	12,764
State	3,889	77,279	4,935	68,987	51,264	11,857	143,422	726	1,482	3,985	785
TOTAL	32,665	422,640	104,661	314,519	246,944	73,751	667,329	26,266	7,196	12,450	13,549
State suppression costs*											
Reimbursements**	NA	NA	$391,363	$1,354,793	$818,792	$504,000	$347,585	$845,812	$1,100,009	$1,601,367	$2,040,520
State obligation											
General Fund (emergency appropriation post fire season)	$3,889,750	$15,966,267	$7,569,613	$4,180,303	$11,665,276	$5,495,528	$13,153,923	$18,005,412	$8,811,607	$2,338,137	$1,585,206
TOTAL	$3,889,750	$15,966,267	$7,569,613	$4,180,303	$11,665,276	$5,495,528	$13,153,923	$18,005,412	$8,811,607	$2,338,137	$1,585,206
TOTAL SUPPRESSION COST	$3,889,750***	$15,966,267***	$7,960,976	$5,535,096	$12,484,068	$5,999,528	$13,501,508	$18,851,224	$9,911,616	$3,939,504	$3,625,726

Notes:
NA = Not available
*Fiscal Year: July 1 - June 30.
**Includes reimbursements from federal sources as well as other states and state agencies.
***Only state's obligation because reimbursement data was unavailable.

OREGON

Oregon uses a three-tiered system for funding wildfire suppression: (1) base funding, (2) statewide severity funding, and (3) large fire funding (**Figure A-2**). The Oregon Forest Land Protection Fund affects all three tiers; therefore, it is described before providing more detail about each tier.

Oregon Forest Land Protection Fund

The Oregon Forest Land Protection Fund (OFLPF) is a state trust fund used for a variety of wildfire suppression purposes (Oregon Revised Statutes 477.750). The fund is overseen by the Emergency Fire Cost Committee made up of four forest landowners or their representatives whose land is assessed in fire protection districts (ORS 477.440). Revenues into the OFLPF come from a variety of sources:

- $0.625 per thousand board feet harvest tax on all timber harvested in Oregon (ORS 321.015(2)),[19]
- $0.075 per acre fire suppression assessment on grazing lands statewide (ORS 477.880(2)(a)),[20]
- $0.05 per acre fire suppression assessment on timberlands in western Oregon (ORS 477.880(2)(b)),[21]
- $0.075 per acre fire suppression assessment on timberlands in eastern Oregon (ORS 477.880(2)(a)),[9] and
- $3.75 from each lot assessed at the minimum amount ($18.75) for the forest patrol assessment (ORS 477.295).[22]

The reserve base of the OFLPF is $22.5 million (ORS 477.760). If the fund reaches that level as of February 16 each year, revenues to the fund are reduced 50% in the following fiscal year (except the timber harvest tax which is reduced for the calendar year). If the fund reaches $30 million, the revenue sources are discontinued until such time as the balance drops below $22.5 million as of February 16, at which time the funding sources are restored in their entirety. Revenue into the OFLPF is approximately, $11.2 million per year[23]

Statutory spending provisions for the OFLPF were changed by the 2013 Oregon Legislature (HB2050) and are continuing to be phased in. For most of the study period (2005-2015) spending from the OFLPF was capped at $10 million per year. As of July 1, 2017 (FY 2018), spending from the OFLPF will be capped at the lessor of $13.5 million per year, or the sum of:

- the lessor of $10 million or 50% of annual fire suppression costs determined by the Emergency Fire Cost Committee (ORS 477.755(3)(b)(A)),[24] plus
- administrative expenses (ORS 477.755(3)(b)(B)), plus
- 50% of Emergency Fire suppression insurance premiums (ORS 477.775(4)),[25] plus
- the lessor of $3 million or three-fifths of the actual costs of statewide severity funding, plus the costs of certain non-routine supplemental fire prevention, detection, and suppression resources for fire protection districts (ORS 477.755(3)(b)(D)).

[19] Rate was raised from $0.50 to $0.625 per thousand board feet in 2007 (HB3044).
[20] Rate was raised from $0.06 to $0.075 per acre in 2007 (HB3044).
[21] Rate was raised from $0.04 to $0.05 per acre in 2007 (HB3044).
[22] Rate was raised from $3.00 to $3.75 per lot and minimum assessment was raised from $18.00 to $18.75 per lot in 2007 (HB3044).
[23] Personal communications, Tim Keith, Oregon Dept. of Forestry, email, 22 June 2016.
[24] Dollar amount was raised from $1 million in FY 2014 to $5 million in FY 2016 to $10 million in FY 2018 by HB 2050.
[25] In 2005, HB 2327 reduced the OFLPF's share from 100% of the premium to 50% beginning in FY 2006.

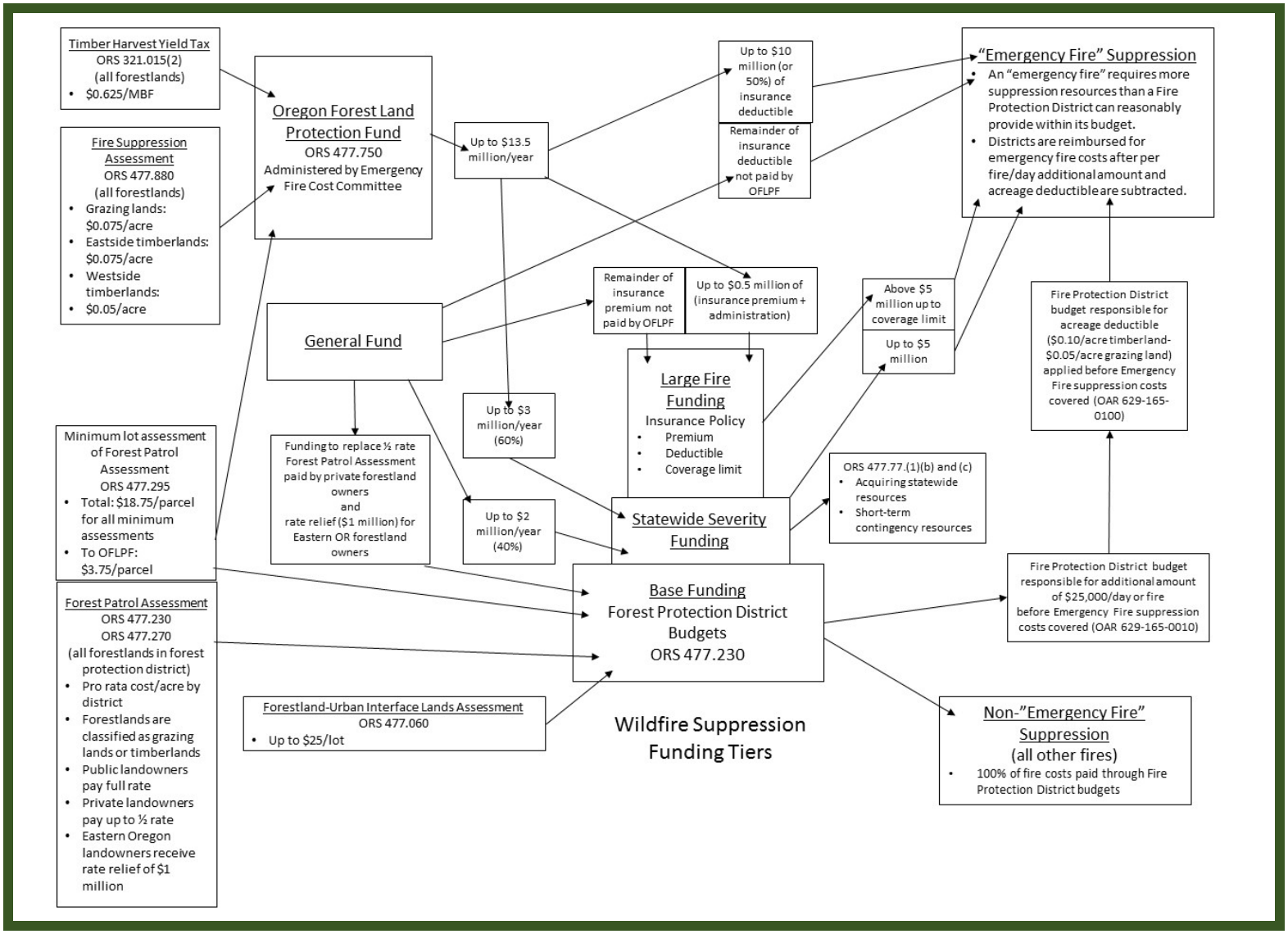

Figure A-2. Oregon's wildfire suppression funding system.

Tier One—Base Funding

Oregon's base wildfire protection program is delivered through the Oregon Department of Forestry's (ODF) local fire protection districts and operating fire protection associations (**Figure A-2**). The base funding tier pays for pre-suppression, readiness, and initial attack by fire protection districts.[26] The base tier of state funding for ODF's Fire Protection Division, including fire protection districts, comes from two sources: (1) public and private landowner assessments and (2) the state's General Fund.

In January of each year, ODF and fire protection districts begin developing a fire protection budget for the upcoming fiscal year (July 1–June 30; ORS 477.235-240). Budgets are submitted to the State Forester and then approved by the Board of Forestry (ORS 477.265). Limitations on costs that can be included in the fire protection budget are outlined in Oregon Administrative Rules 629-041-0020. The budgetary goal is to provide an adequate level of protection.

Landowner assessments for the base tier of fire protection, called "Forest Patrol Assessments," vary by land use (e.g., timberland vs. forested grazing land), ownership (public vs. private), and geographic region (**Table A-8**). Forested lands within forest protection districts are classified as either grazing land or timberland (ORS 477.205). Actual wildfire costs used to determine forest protection district budgets and forest patrol assessments are proportioned between grazing land and timberland via a formula (OAR 629-041-0010). Forest protection associations protect all lands within their district including their members' forest land by agreement with the State Forester (ORS 477.406)). The budgeting process and assessment rate determination is the same as for state districts (ORS 477.880(1)(c)).

Forest Patrol Assessments are a "pro rata cost per acre" based on the forest protection district budget (ORS 477.230). Public timberlands and grazing lands within a forest protection district are assessed at the full rate. Forest Patrol Assessments for private timberlands and grazing lands may not exceed one-half the full rate. The remaining portion (up to half the amount of the private forestlands assessment) is funded by the state's General Fund.[27] In addition, the General Fund is used to provide rate relief up to $1 million for low productivity forestlands in eastern Oregon (ORS 477.777(1)(e)). The minimum Forest Patrol Assessment for any parcel is $18.75 (unless the provisions of ORS 477.760 apply; i.e., the OFLPF financial obligations exceed the fund's resources).

When fire suppression costs are in excess of the fire protection district budget, exclusive of those costs eligible for equalization by the OFLPF, they are included in the next year's budget and assessment rate (ORS 477.232). Budget surpluses may be carried forward into the next fiscal year.

Tier Two—Statewide Severity Funding

The next tier of Oregon's wildfire suppression funding scheme is called "severity funding" (**Figure A-2**). Severity funding is set at a maximum of $5 million per fiscal year, with up to $2 million (40%) coming from the state's General Fund and up to $3 million (60%) coming from the OFLPF (ORS 477.755). The activities funded by the OFLPF portion of severity funding include acquiring and placing centrally managed fire suppression resources for statewide use and acquiring fast-mobilizing, short-term contingency resources for statewide use based on predictions of severe fire weather, widespread lightening events or resource shortages due to a heavy fire season in the state, the western U.S., or nationally (ORS 477.777(1)(b) and (c)).

[26] Personal communications, Tim Keith, Oregon Dept. of Forestry, email, 6 July 2016.
[27] Personal communications, Tim Keith, Oregon Dept. of Forestry, e-mail, 22 June 2016.

Table A-8. Oregon wildfire suppression funding base layer, FY 2016, as an example.*

District	Forest land classification	FY 2016 acres	FY 2016 net budget	FY 2016 full rate	50% of FY 2016 rate**	Rate adjusted for Eastern OR***	OFLPF assessment****
Northwest Oregon Area							
Northwest	Timber	1,747,450	$4,425,415	$2.4154	$1.2077		$0.050
West Oregon	Timber	1,082,535	$2,470,556	$1.8430	$0.9215		$0.050
North Cascade	Timber	655,987	$1,837,749	$2.5751	$1.2876		$0.050
Southern Oregon Area							
Southwest	Timber	1,700,248	$6,800,688	$3.8362	$1.9181		$0.050
	Grazing	172,955	$570,014	$1.5151	$0.7576		$0.075
Coos	Timber	1,491,584	$4,317,925	$2.4575	$1.2288		$0.050
	Grazing	61,203	$130,444	$1.6938	$0.8469		$0.075
Douglas	Timber	1,401,106	$5,001,046	$2.8303	$1.4152		$0.050
	Grazing	274,659	$494,523	$1.3564	$0.6782		$0.075
South Cascade	Timber	1,133,150	$3,409,987	$2.3528	$1.1764		$0.050
Western Lane	Timber	761,164	$2,083,991	$2.1197	$1.0599		$0.050
Eastern Oregon Area							
	Timber	1,039,585	$4,749,315	$4.4777	$2.2389	$2.0465	$0.075
	Grazing	961,052	$1,566,477	$1.7967	$0.8984	$0.7060	$0.075
	Z1*****	236,848	$70,979	$0.3000			
Northeast Oregon	Timber	876,282	$3,193,580	$3.1502	$1.5751	$1.3827	$0.075
	Grazing	993,521	$1,219,815	$1.0082	$0.5041	$0.3117	$0.075
Klamath-Lake	Timber	1,066,708	$3,838,779	$3.2453	$1.6227	$1.4303	$0.075
	Grazing	486,384	$734,275	$1.1962	$0.5981	$0.4057	$0.075
Walker Range	Timber	186,635	$952,022	$3.2982	$1.6491	$1.4567	$0.075
	Grazing	2,472	$9,426	$1.2032	$0.6016	$0.4092	$0.075
TOTAL		13,142,434	$43,081,053				

*Base layer funding pays for pre-suppression and readiness, as well as initial attack (suppression).

**Remaining 50% of funding is allocated from state General Fund.

***Rates in eastern Oregon (low productivity lands) are adjusted so that the total assessment is reduced by $1 million that is then paid by the General Fund (ORS 477.777(1)(e)).

****Oregon Forest Landowner Protection Fund. Not part of base layer funding, but is part of fire suppression assessment to landowners.

*****Zone 1 lands in Eastern Oregon Area result from designation in the 1960s that allowed all wildlands, not just forestlands, to be protected within a fire protection district, assuming the landowners agreed. Only Grant County set up Zone 1 lands. The rate for protection services is computed by the district and must be approved by the county commission (in Grant County it's the county court). The assessed costs in Zone 1 lands are not matched by the state General Fund, nor are wildfires on Zone 1 lands eligible for emergency fire cost reimbursement by the OFLPF (personal communications, Tim Keith, ODF, e-mail 7/7/2016).

Tier Three—Large Fire Funding

The top tier of Oregon's funding scheme is a large fire funding tier that includes OFLPF, the General Fund, and an insurance policy (**Figure A-2**). The insurance policy contains three important elements: the insurance premium, the deductible, and the coverage limit.

Before February 1 of each year, the Emergency Fire Cost Committee and the State Forester consult about whether to buy emergency fire suppression costs insurance and the level of insurance to obtain (ORS 477.775(1)). Considerations for the decision include: cost, coverage and deductible for the insurance; suppression funding available from the OFLPF; current forest conditions; long-term weather predictions; available firefighting resources; and available funds for purchasing insurance.

Table A-9 outlines the history of the insurance program. Throughout the 1970s the coverage limit was $1 million, rising to $2 million throughout most of the 1980s. Beginning in 1990 the coverage limit increased dramatically to $35 million, rising to $43 million in the early 2000s. Dramatically rising insurance premiums led to a legislative solution in 2005 (HB2327) that increased the deductible from $15 to $25 million, shared the cost of the deductible between the OFLPF and General Fund (in a layered fashion) and split the premium 50-50 between the OFLPF and the General Fund (ORS 477.775(4)). Since then, the coverage limit has been $25 million. The deductible ("retention"), or the amount the state funds before the insurance pays, has increased over time. Throughout much of the last decade it was $25 million, dropping to $20 million with the passage of HB2050 in 2013 that created the $5 million severity funding tier, but rose to $50 million in 2015-2016. Throughout much of the last decade premiums were less than $1 million, but rose to $2 million in 2014-2015 and $3.8 million in 2015-2016 following two successive fire seasons with full policy limit losses (i.e., Emergency Fire suppression costs exceeded the $20 million deductible).

Oregon's Wildfire Suppression Costs

Table A-10 shows acres burned under Oregon’s protection, 2005-2015, and Emergency Fire suppression costs for 2006 to 2015. Oregon was unable to provide cost data for 2005. Spending on fire suppression (i.e., initial attack by forest protection districts' budgets) from the base tier of Oregon's tiered system is not included.

As outlined in detail above, the Emergency Fire suppression funding changed considerably as a result of the passage of HB2050 in 2013. In summary, the act provides for $20 million of Emergency Fire suppression funds from the OFLPF and the General Fund. These costs were initially layered and a 50-50 shared formula was phased in over 3 biennia. On July 1, 2017, the $20 million will be fully 50-50. Costs of suppression between $20 and $50 million (the current insurance policy retention) are borne by the state General Fund. If Emergency Fire suppression costs exceed $75 million (the $50 million retention plus the $25 million policy), the costs are the responsibility of the General Fund.

Wildland Urban Interface

Forestlands inside a forest protection district where a concentration of structures exist in an urban or suburban setting can be classified as "forestland-urban interface" lands (ORS 477.015). The ODF takes a lead role in coordinating fire protection of such lands between other state and federal agencies, local governments, and private sector interests, and can enter into cooperative agreements with those entities (ORS 477.023). Owners of forestland-urban interface lands are required to meet minimum fire hazard reduction requirements set by ODF, or else they are liable for fire suppression costs up to $100,000 (ORS 477.059). In setting the Forest Patrol Assessment, ODF can add an additional assessment not exceeding $25 per property lot for additional costs of fire protection on forestland-urban interface lands (ORS 477.060).

Table A-9. Oregon emergency fire insurance program summary.

Fire Season	Insurance Year*	Premium Cost	Insurance Deductible**	Coverage Limit	Net Emergency Fire Costs***	Insurance Claim
1973	73-74	$45,000	$325,000	$1,000,000	$853,801	$528,801
1974	74-75	$45,000	$325,000	$1,000,000	$453,331	$128,331
1975	75-76	$75,000	$500,000	$1,000,000	$299,721	$0
1976	76-77	NO COVERAGE			$304,240	
1977	77-78	$92,850	$500,000	$1,000,000	$465,503	$0
1978	78-79	$77,006	$500,000	$1,000,000	$640,372	$140,372
1979	79-80	$61,919	$500,000	$1,000,000	$1,166,147	$666,147
1980	80-81	$138,875	$1,000,000	$1,000,000	$887,888	$0
1981	81-82	$174,750	$1,000,000	$2,000,000	$3,048,422	$2,000,000
1982	82-83	$174,750	$1,000,000	$2,000,000	$237,146	$0
1983	83-84	$170,000	$1,000,000	$2,000,000	$0	$0
1984	84-85	$144,968	$1,000,000	$2,000,000	$41,360	$0
1985	85-86	NO COVERAGE			$414,723	
1986	86-87	$170,000	$3,000,000	$2,000,000	$4,217,318	$917,993
1987	87-88	$244,045	$2,000,000	$2,000,000	$19,002,716	$2,000,000
1988	88-89	$1,781,493	$2,000,000	$7,650,000	$9,600,000	$7,549,771
1989	89-90	$1,956,109	$4,000,000	$8,000,000	$5,216,613	$1,216,613
1990	90-91	$2,418,438	$7,500,000	$35,000,000	$4,511,611	$0
1991	91-92	$2,418,438	$7,500,000	$35,000,000	$3,406,772	$0
1992	92-93	$2,418,438	$7,500,000	$35,000,000	$12,850,855	$5,350,855
1993	93-94	$2,878,421	$8,000,000	$34,500,000	$1,954,271	$0
1994	94-95	$2,668,039	$8,000,000	$34,500,000	$14,669,153	$6,669,153
1995	95-96	$2,777,477	$10,000,000	$32,500,000	$3,618,209	$0
1996	96-97	$2,714,577	$10,000,000	$32,500,000	$2,410,977	$0
1997	97-98	$2,539,980	$10,000,000	$33,000,000	$36,189	$0
1998	98-99	$2,380,439	$10,000,000	$33,000,000	$666,713	$0
1999	99-00	$2,372,098	$10,000,000	$43,000,000	$3,036,044	$0
2000	00-01	$2,372,098	$10,000,000	$43,000,000	$5,780,952	$0
2001	01-02	$2,266,528	$10,000,000	$43,000,000	$14,889,423	$4,880,003
2002	02-03	$3,345,305	$10,000,000	$43,000,000	$30,001,937	$19,975,885
2003	03-04	$3,570,743	$15,000,000	$20,575,000	$9,180,727	$0
2004	04-05	$3,875,425	$15,000,000	$25,000,000	$2,017,509	$0
2005	05-06	$1,290,626	$25,000,000	$25,000,000	$13,196,716	$0
2006	06-07	$1,290,626	$25,000,000	$25,000,000	$9,238,746	$0
2007	07-08	$1,081,510	$25,000,000	$25,000,000	$14,125,366	$0
2008	08-09	$907,966	$25,000,000	$25,000,000	$9,129,075	$0
2009	09-10	$907,972	$25,000,000	$25,000,000	$5,387,719	$0
2010	10-11	$860,776	$25,000,000	$25,000,000	$5,036,777	$0
2011	11-12	$811,590	$25,000,000	$25,000,000	$2,807,534	$0
2012	12-13	$854,926	$25,000,000	$25,000,000	$5,330,065	$0
2013	13-14	$923,318	$20,000,000	$25,000,000	$74,628,615	$25,000,000
2014	14-15	$2,012,041	$20,000,000	$25,000,000	$47,605,496	$25,000,000
2015	15-16	$3,832,815	$50,000,000	$25,000,000	$29,607,814	$0
Total (nominal $)		**$61,142,375**				**$102,023,924**

* Insurance Year runs from April 1, Fiscal Year X to March 31, Fiscal Year X+1

**The amount of Emergency Fire costs the state must incur before an insurance claim is paid.

***Emergency Fire costs after reimbursements (e.g., FEMA, other federal agencies).

Table A-10. Oregon acres burned under state protection and state Emergency (large) Fire costs, 2006-2015.*

	Year					
	2005	**2006**	**2007**	**2008**	**2009**	**2010**
Acres burned						
Under state protection**	99,610***	11,270	54,733	7,487	7,034	6,121
TOTAL	99,610	11,270	54,733	7,487	7,034	6,121
State suppression costs**						
Reimbursements		$3,463,000	$6,249,000	$2,309,000	$1,120,000	$1,334,000
Fire cost recovery (reimbursements from other agencies)		$800,000	$800,000	$2,400,000	$1,700,000	$0
FEMA reimbursements		$900,000	$0	$0	$2,400,000	$0
District deductibles (both per fire and acreage) for Emergency Fire suppression costs		$1,200,000	$1,400,000	$1,200,000	$1,100,000	$600,000
State obligation						
OFLPF obligation (50% of "insurance deductible", up to $10 million)		$9,300,000	$14,100,000	$9,000,000	$5,400,000	$5,000,000
General Fund "insurance deductible" obligation (remainder)		$0	$0	$0	$0	$0
General Fund obligation after insurance claim		$0	$0	$0	$0	$0
TOTAL (without insurance premium)		$9,300,000	$14,100,000	$9,000,000	$5,400,000	$5,000,000
Insurance claim (up to coverage limit)		$0	$0	$0	$0	$0
TOTAL STATE FIRE SUPPRESSION COST		$12,200,000	$16,300,000	$12,600,000	$10,600,000	$5,600,000
Additional state obligation for insurance premium						
Insurance premiums for Fire Insurance Year*****		$1,290,626	$1,081,510	$907,966	$907,972	$860,776
TOTAL STATE OBLIGATION INCLUDING INSURANCE PREMIUM		$10,590,626	$15,181,510	$9,907,966	$6,307,972	$5,860,776

Notes:

Bold figures indicate estimated costs.

*Only Emergency Fire suppression costs reported, not suppression costs paid through fire protection districts by "base layer" funding from General Fund, Forest Patrol Assessments, and Forest Urban Interface Lands Assessment. All fire cost figures were rounded to the nearest $0.1 million by Oregon Department of Forestry.

**Not differentiated by ownership.

***Data not available from Oregon Department of Forestry. Estimate based on data from NIFC (2016a).

****Fiscal Year: July 1 - June 30.

*****Fire Insurance Year runs from April 1, Fiscal Year X to March 31, Fiscal Year X+1

table continues on next page

Table A-10. continued.

	Year				
	2011	**2012**	**2013**	**2014**	**2015**
Acres burned					
Under state protection**	2,637	17,547	104,167	53,387	86,629
TOTAL	2,637	17,547	104,167	53,387	86,629
State suppression costs**					
Reimbursements	$4,239,000	**$7,813,000**	**$8,455,000**	**$3,980,000**	**$17,902,000**
Fire cost recovery (reimbursements from other agencies)	$0	**$0**	**$2,800,000**	**$9,500,000**	**$25,600,000**
FEMA reimbursements	$0	**$0**	**$43,300,000**	**$17,700,000**	**$19,600,000**
District deductibles (both per fire and acreage) for Emergency Fire suppression costs	$1,100,000	**$1,400,000**	**$1,700,000**	**$2,100,000**	**$2,000,000**
State obligation					
OFLPF obligation (50% of "insurance deductible", up to $10 million)	$2,800,000	**$5,500,000**	**$10,000,000**	**$10,000,000**	**$10,000,000**
General Fund "insurance deductible" obligation (remainder)	$0	**$0**	**$10,000,000**	**$10,000,000**	**$10,000,000**
General Fund obligation after insurance claim	$0	**$0**	$30,000,000	$2,700,000	**$10,100,000**
TOTAL (without insurance premium)	$2,800,000	$5,500,000	$50,000,000	$22,700,000	$30,100,000
Insurance claim (up to coverage limit)	$0	**$0**	$25,000,000	**$25,000,000**	$0
TOTAL STATE FIRE SUPPRESSION COST	$3,900,000	$6,900,000	$122,800,000	$77,000,000	$77,300,000
Additional state obligation for insurance premium					
Insurance premiums for Fire Insurance Year*****	$811,590	$854,926	$923,318	$2,012,041	$3,832,915
TOTAL STATE OBLIGATION INCLUDING INSURANCE PREMIUM	$3,611,590	$6,354,926	$50,923,318	$24,712,041	$33,932,915

Notes:

Bold figures indicate estimated costs.

*Only Emergency Fire suppression costs reported, not suppression costs paid through fire protection districts by "base layer" funding from General Fund, Forest Patrol Assessments, and Forest Urban Interface Lands Assessment. All fire cost figures were rounded to the nearest $0.1 million by Oregon Department of Forestry.

**Not differentiated by ownership.

***Data not available from Oregon Department of Forestry. Estimate based on data from NIFC (2016a).

****Fiscal Year: July 1 - June 30.

*****Fire Insurance Year runs from April 1, Fiscal Year X to March 31, Fiscal Year X+1

Rangeland Fire Protection

For fire protection purposes, "rangeland" is land east of the Cascade Mountains, not classified as forestland, and not within a forest protection district, that is undeveloped containing sagebrush, juniper, and similar type vegetation (ORS 477.315). Rangeland is not the same as forestland classified as "grazing land" that is included in forest protection districts.

Owners of rangeland may form rangeland protection districts for the purpose of protecting rangelands from fire (ORS 477.317). ODF may enter into cooperative agreements or contracts with rangeland protection associations to assist with organizing the association, training its members, and acquiring firefighting equipment. ODF also may assist the associations with payment for liability insurance and administrative expenses, not to exceed 50% of the association's annual budgeted operating costs and cash equivalent of in-kind supplies and services. ODF may not use Forest Patrol Assessment monies to assist rangeland protection associations.

Landowners within a rangeland protection association work with ODF to prepare a budget for protection (ORS 477.325). Funding for protection is collected from rangeland owners pursuant to the cooperative agreement or contract with ODF, deposited in the State Forestry Department Account, and used solely for fire protection in rangeland protection districts.

UTAH

Utah's fire suppression funding system relies on cooperation between the state and its counties. The Utah Division of Forestry, Fire and State Lands in the Department of Natural Resources is the state agency responsible for wildfire suppression. In 2016, the Utah Legislature made several changes to the state's wildfire suppression system (SB122) and funding mechanism (SB212); therefore, the system as it existed during the study period (2005-2015) is described as well as how it looks as of January 1, 2017.

Pre-2017

The Division was responsible for wildfire suppression on nonfederal forest, range, and watershed lands in unincorporated areas of the state (Utah Code 65A-8-101). Counties were responsible for fire suppression on privately-owned or county-owned forest, range, or watershed lands (Utah Code 65A-2-202). However, counties participated in the state's wildfire protection system and become eligible for state assistance through cooperative agreement with the Division. Actual costs of fire suppression undertaken by the Division on privately-owned lands were charged against the county where the land is located, unless the cooperative agreement provided otherwise (Utah Code 65A-8-202).

The Division funded its wildfire suppression costs through a "private-purpose trust fund" known as the Wildland Fire Suppression Fund (2006 Utah Code 65A-8-6.1 recoded to 2007 Utah Code 65A-8-204 by HB48 in 2007). Revenues deposited into the Wildland Fire Suppression Fund included:

- payments by counties for wildfire suppression,
- interest and earnings from investment of the fund's money; and
- money appropriated by the Legislature.

The fund balance was capped at $8 million.

In 2005, counties with cooperative agreements with the state paid into the Wildland Fire Suppression Fund an amount 0.01 times the number of acres of privately-owned or county-owned land in the unincorporated area of the county, and 0.0001 times the taxable value of real property in the unincorporated area of the county (Utah Code 65A-8-205). In 2006, the Legislature raised the county contribution based on real property value to 0.0001151 and excluded from assessment lands subject to concentrated residential, commercial or industrial development that would not be exposed to wildfire and contribute to its spreading (SB65).

If a county had a cooperative agreement and a mutually acceptable budget with the Division, the state paid one-half of actual fire suppression costs determined to be "normal" (Utah Code 65A-8-203), the average of the last seven years (Utah Administrative Code R652-121-200). Since FY 1998, this portion of the Legislature's appropriation to the Wildland Fire Suppression Fund had been $1.5 million annually.

When state firefighting obligations exceeded the balance in the state's portion of the Wildland Fire Suppression Fund, the Legislature appropriated additional funds from the state's General Fund. This occurred in FY 2005 ($1.3 million), FY 2006 ($4.0 million), FY 2007 ($8.2 million), FY 2008 ($6.0 million) and FY 2013 ($13.5 million). In addition, in FY 2009, the counties' portion of the fund was depleted, and the Legislature appropriate $4.0 million from the state's General Fund to make it solvent.

Table A-11 shows Utah's state and private acres burned and state wildfire suppression costs 2005 to 2015.

Beginning in 2017

The Division, *in consultation with local authorities*, is responsible for *managing wildfires on nonfederal forest, range, watershed, and wildland urban interface lands* (Utah Code 65A-8-101; *changes made by 2016 Legislature effective January 1, 2017 are italicized*). Counties are responsible for fire suppression on unincorporated, privately-owned, or county-owned forest, range, watershed, or *wildland urban interface lands within their boundaries* (Utah Code 65A-2-202). *Municipalities are responsible for wildfire suppression on privately-owned and municipally-owned forest, range, watershed, and wildland urban interface lands within their boundaries* (Utah Code 65A-8-205.5). Counties *and*

municipalities are able to participate in the state's wildfire protection system and become eligible for state assistance through cooperative agreement with the Division *provided that the county or municipality takes actions to reduce wildfire risk*.

Beginning in 2017, a new "expendable special revenue" Wildland Fire Suppression Fund was created, and revenues into the fund include:

- fund balance from previous year,
- 30% of the federal mineral lease bonus payments for the previous fiscal year from the Mineral Lease Bonus Account up to $2 million but not exceeding 20% of the amount expended in the previous fiscal year from the Wildland Fire Suppression Fund (Utah Code 59-21-2.(1)(e));
- $4 million from the state's General Fund (subject to the overall cap for the Wildland Fire Suppression Fund);
- costs recovered from settlements and legal actions related to wildfire suppression;
- federal and other state agency reimbursements for wildfire suppression costs;
- interest and earnings from the investment of fund money; and
- other money appropriated by the Legislature.

The maximum level of the fund will be $12 million (65A-8-204). *Counties are no longer required to pay into the Wildland Fire Suppression Fund.* The 2016 Utah Legislature also appropriated $2 million from the Mineral Bonus Account to the Wildland Fire Suppression Fund for FY 2017 (SB212).

Table A-11. Utah state and private acres burned and state wildfire suppression costs, 2005-2015.

	Year										
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Acres burned*											
Private (including tribal)	49,995	49,794	76880	844	9,190	289	16,358	81,624	16,505	NA	NA
State	1,833	2,637	73074	10,082	7,736	9,403	8,429	52,481	5,011	6,648	4,306
TOTAL	51,828	52,431	149,954	10,926	16,926	9,692	24,787	134,105	21,516	6,648	4,306
State suppression costs**											
Reimbursements***	$59,174	$193,956	$3,065,888	$140,540	$1,183,572	$1,357,630	$121,706	$2,167,178	$1,101,046	$11,795	NA
State obligation											
General Fund (base appropriation to Wildland Fire Suppression Fund prior to fire season)	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000
Carryover of Wildland Fire Suppression Fund (prior years' surplus/deficit)	$1,103,939	($1,264)	$335,220	$4,469,052	$2,220,904	$661,814	$727,694	$343,150	$1,001,582	$6,211,286	$3,886,124
General Fund (supplemental appropriation to Wildland Fire Suppression Fund post fire season)	$1,300,000	$4,000,000	$8,225,000	$6,000,000	$0	$0	$0	$0	$13,510,000	$0	$0
County payments (into Wildland Fire Suppression Fund)	$1,034,349	$932,140	$1,123,929	$1,302,815	$1,130,885	$1,182,032	$1,181,084	$1,153,595	$1,082,217	$1,092,933	$1,122,649
TOTAL	$4,938,288	$6,430,876	$11,184,149	$13,271,867	$4,851,789***	$3,343,846	$3,408,778	$2,996,745	$17,093,799	$8,804,219	$6,508,773
TOTAL SUPPRESSION COST	$4,997,462	$6,624,832	$14,250,037	$13,412,407	$6,035,361	$4,701,476	$3,530,484	$5,163,923	$18,194,845	$8,816,014	NA

Notes:
NA = Not available.
*Source for 2007-2015 data is NIFC (2016a).
**Fiscal Year: July 1 - June 30.
***Reimbursements from federal sources.
***In addition, for FY 2009, the Utah Legislature appropriated $4.0 million to the Wildland Fire Suppression Fund to address solvency issues for the county payments portion of the fund.

WASHINGTON

The Washington Department of Natural Resources (DNR) is the state agency charged with suppressing wildfires on all state and private forestlands (Revised Code of Washington 76.04.015). "Forestland" is any unimproved land which has enough trees to constitute a fire hazard (RCW 76.04.005). Sagebrush and grass areas east of the Cascade mountains can be considered forestlands when they are adjacent to or intermingled with areas supporting tree growth. Forestland, for wildfire protection purposes, does not include structures (RCW 76.04.005). The Commissioner of the DNR is advised by a Wildland Fire Advisory Committee on all matters related to wildland firefighting (RCW 76.04.179).

Some areas of private forest land, particularly in the wildland urban interface, are protected by rural or municipal fire districts instead of the DNR (Washington Administrative Code 332-24-710, WAC 332-24-720, WAC 332-24-730). Areas where the DNR is responsible for fire suppression are called Forest Protection Zones and include all forestlands the DNR is obligated to protect, but not forestlands within rural or municipal fire districts protected by those entities (RCW 76.04.165). The primary mission of the DNR when fighting wildfire is protecting forest resources and suppressing the fire; protecting improved property and suppressing structural fires is primarily the responsibility of rural fire districts and municipal fire departments (RCW 76.04.167).

The DNR also can cooperate and share fire suppression expenses with non-state fire protective agencies comprised of timber owners (RCW 76.04.095). The DNR also can enter into contracts to provide fire suppression on lands where a municipality, county, state or federal agency has suppression responsibilities (RCW 76.04.135). The entities can exchange services on a cooperative basis, or in return for cash or other compensation.

The DNR is required to maximize the utilization of local fire suppression assets (RCW 76.04.015), including private resources to the extent it can (RCW 76.04.181). In fire suppression efforts, the DNR can cooperate with other states, federal agencies, Canadian agencies, and county, municipal, and Tribal governments within Washington if it's in the best interest of the state (RCW 76.04.015). The DNR can provide suppression services on nonforested public lands it or another state agency manages, but only to extent it doesn't interfere with suppressing forest fires. The DNR is reimbursed by other state agencies for firefighting expenditures on the other agency's land (RCW 76.04.015). Non-state entities that are required by law to aid in wildfire suppression are entitled to reimbursement for suppression costs, if they weren't responsible for starting the fire (RCW 76.04.475). A person who negligently starts a wildfire is liable for reasonable expenses of firefighting costs (RCW 76.04.495).

Washington statute distinguishes between emergency fire costs and nonemergency fire costs (RCW 76.04.005). Nonemergency fire costs are regularly budgeted and provided for in the biennium in which they occur. "Emergency fire costs" are incurred by the DNR for emergency forest fire suppression above the nonemergency fire costs.

The DNR's state fire suppression responsibilities are funded primarily through the state's General Fund and a forest landowner assessment. The landowner assessment, "Special Forest Fire Suppression Account Assessment," is capped at no more than $7.50 flat fee for landowners with 50 or less acres, or the flat fee plus no more than $0.15 per acre for each acre over 50 for those landowners with more than 50 acres (RCW 76.04.630). For landowners who undertake commercial operations (RCW 76.04.005), the assessment may vary based on fire suppression cost history for their land. The assessment is paid by all private and non-federal public landowners protected by the DNR.

The landowner assessment is paid into the Landowner Contingency Forest Fire Suppression Account (RCW 76.04.630). The account is used to pay for Emergency Fire costs resulting from fires on lands of participating landowners. The account also can be used for abatement of extreme fire hazard (RCW 76.04.660), which is not a suppression cost, and revenues recovered for such expenditures, which can be up to twice the amount expended, are returned to the account. In addition, if a fire starts as a result of landowner commercial operations and appropriated General Funds are used for suppression, the

Landowner Contingency Forest Fire Suppression Account is used to reimburse the General Fund (see more detail below). The target balance for the account is $3 million.

The state divides its General Fund fire suppression accounting into three parts. General Fund-Federal is where federal reimbursements for DNR assistance to federal agencies are accounted for. General Fund-Local is where local reimbursements for DNR assistance to local agencies are accounted for. This study considers the federal and local accounts to be reimbursements. General Fund-State is where DNR state fire suppression responsibilities are paid from.

General Fund-State appropriations to the DNR normally provide funds for Emergency Fire costs incurred in forest fire suppression. When a fire starts as a result of a landowner commercial operation, expenditures from General Fund-State appropriations for suppression of the fire are reimbursed from the Landowner Contingency Forest Fire Suppression Account. The DNR returns the recovered moneys back to the General Fund-State, unless they are recovered in the same biennium in which case they can be spent on additional suppression expenses. Loans between the General Fund-State and the Landowner Contingency Forest Fire Suppression Account are authorized for Emergency Fire suppression, but cannot exceed the amount appropriated for Emergency Fire suppression costs, and the loans bear interest (RCW 76.04.620). Legislative appropriations from the General Fund-State for fire suppression occur both in advance (base appropriation) and post fire (supplemental appropriation).

The state Disaster Response Account also may be used for fire suppression expenditures when the governor has declared a state of emergency because of the fire (RCW 38.52.105). Revenues into the account come from Legislative appropriations and transfers, federal appropriations, or other sources. Expenditures from the account are by appropriation only for support of state agency and local government disaster response and recovery efforts. The Legislature appropriates variable portions of this account for fire suppression.

Table A-12 shows acres burned under Washington's protection and state wildfire suppression costs 2005 to 2015.

Wildfire Preparedness Funding

The Forest Fire Protection Assessment (FFPA), along with General Fund monies, are used to fund forest protection (RCW 76.04.610). Forest protection funding does not include fire suppression, but is used to be sure that the DNR is prepared and quipped to respond to forest fires. The annual FFPA is $17.50 plus $0.27 per acre for each acre above 50. Fees for multiple parcels in the same county are adjusted so the multiple administrative fees are refunded and the per-acre fee is on the total acreage. Up to $200,000 per year of FFPA revenues can be used by DNR to support rural fire districts that assist DNR in protecting forest lands. Counties retain $0.50 of the FFPA on a parcel as an administration fee. All nonfederal publicly-owned forests have to pay the FFPA.

Table A-12. Washington acres burned under state protection and state wildfire suppression costs, 2005-2015.

	Year										
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Acres burned											
Under state protection*	60,280	48,803	23,835	32,680	13,671	25,440	6,952	22,716	93,656	197,705	315,119
TOTAL	60,280	48,803	23,835	32,680	13,671	25,440	6,952	22,716	93,656	197,705	315,119
State suppression costs**											
Reimbursements											
Clarke-McNary Account	$0	$721,093	$0	$1,612,789	$0	$0	$0	$0	$0	$0	$0
Other federal reimbursements	$438,813	$2,506,485	$12,097,884	$4,200,627	$4,359,979	$1,457,908	$1,376,322	$1,344,727	$4,054,752	$4,076,600	$11,416,009
General Fund-Local	$27,654	$12,106	$0	$64,604	$7,505	$12,708	$0	$0	$0	$164,323	$90,323
TOTAL	$466,467	$3,239,684	$12,097,884	$5,878,020	$4,367,484	$1,470,616	$1,376,322	$1,344,727	$4,054,752	$4,240,923	$11,506,332
State obligation											
General Fund-State (base appropriation prior to fire season)	$8,358,000	$10,635,000	$13,635,000	$11,463,000	$13,792,000	$11,128,000	$11,128,000	$8,030,000	$10,037,000	$19,099,000	$19,099,000
General Fund-State (supplemental appropriation post fire season)	$8,707,240	$54,000	$20,791,140	$2,457,000	$11,701,156	$11,542,000	$319,289	$0	$31,801,749	$6,172,000	$54,511,547
Landowner Contingency Forest Fire Suppression Account	$634,820	$3,395,516	$1,444,233	$212,740	$307,016	$172,728	$99,113	$93,677	$140,434	$309,090	$184,755
Disaster Response Account	$0	$5,000,000	$0	$5,000,000	$0	$1,560,869	$3,439,131	$3,813,160	$1,186,840	$1,073,920	$3,926,079
TOTAL	$17,700,060	$19,084,516	$35,870,373	$19,132,740	$25,800,172	$24,403,597	$14,985,533	$11,936,837	$43,166,023	$26,654,010	$77,721,381
TOTAL SUPPRESSION COST	$18,166,527	$22,324,200	$47,968,257	$25,010,760	$30,167,656	$25,874,213	$16,361,855	$13,281,564	$47,220,775	$30,894,933	$89,227,713

Notes:
*Not differentiated by ownership.
**Fiscal Year: July 1 - June 30.

APPENDIX B. General Fund Data by State and Year

Table B-1. General Funds (GF) spent on wildfire suppression and total GF revenues, 2005-2015, by state (millions of dollars).

	AK	AZ	CA	ID	MT	NM	OR	UT	WA	TOTAL
2005										
GF wildfire	$20.5		$531.9	$11.3	$3.0	$3.9		$3.9	$17.1	$591.6
GF total	$3,189	$7,957	$82,209	$2,268	$1,531	$4,969	$5,516	$4,083	$12,067	$123,789
%	0.64%		0.65%	0.50%	0.19%	0.08%		0.10%	0.14%	0.48%
2006										
GF wildfire	$12.5		$617.0	$4.8	$5.1	$16.0	$1.3	$5.5	$10.7	$672.7
GF total	$4,200	$9,285	$93,451	$2,432	$1,717	$5,559	$6,312	$4,864	$13,139	$140,959
%	0.30%		0.66%	0.20%	0.29%	0.29%	0.02%	0.11%	0.08%	0.48%
2007										
GF wildfire	$11.2		$771.0	$22.4	$39.7	$7.6	$1.1	$10.1	$34.4	$897.5
GF total	$5,101	$9,553	$95,469	$2,811	$1,838	$5,828	$6,430	$5,308	$14,180	$146,518
%	0.22%		0.81%	0.80%	2.16%	0.13%	0.02%	0.19%	0.24%	0.61%
2008										
GF wildfire	$6.8		$1,002.7	$10.3	$51.4	$4.2	$0.9	$12.0	$13.9	$1,102.3
GF total	$10,508	$9,587	$102,522	$2,909	$1,954	$6,132	$5,890	$5,213	$14,614	$159,329
%	0.06%		0.98%	0.36%	2.63%	0.07%	0.02%	0.23%	0.10%	0.69%
2009										
GF wildfire	$43.6	$4.0	$783.6	$3.6	$6.9	$11.7	$0.9	$3.7	$25.5	$883.5
GF total	$5,584	$8,276	$82,772	$2,465	$1,808	$5,321	$5,836	$4,567	$14,017	$130,646
%	0.78%	0.05%	0.95%	0.15%	0.38%	0.22%	0.02%	0.08%	0.18%	0.68%
2010										
GF wildfire	$39.3	$4.0	$762.7	$6.7	$5.6	$5.5	$0.9	$2.2	$22.7	$849.6
GF total	$5,330	$8,325	$87,046	$2,265	$1,627	$4,798	$6,017	$4,193	$13,571	$133,172
%	0.74%	0.05%	0.88%	0.29%	0.35%	0.11%	0.01%	0.05%	0.17%	0.64%
2011										
GF wildfire	$49.9	$4.0	$700.3	$3.6	$2.5	$13.2	$0.8	$2.2	$11.4	$787.9
GF total	$7,673	$8,381	$93,443	$2,444	$1,783	$5,471	$6,504	$4,659	$14,648	$145,006
%	0.65%	0.05%	0.75%	0.15%	0.14%	0.24%	0.01%	0.05%	0.08%	0.54%
2012										
GF wildfire	$13.3	$4.0	$764.8	$14.5	$16.8	$18.0	$0.9	$1.8	$8.0	$842.1
GF total	$9,485	$8,228	$86,786	$2,587	$1,871	$5,817	$6,941	$4,859	$14,874	$141,448
%	0.14%	0.05%	0.88%	0.56%	0.90%	0.31%	0.01%	0.04%	0.05%	0.60%
2013										
GF wildfire	$43.4	$4.0	$714.3	$15.6	$57.2	$8.8	$40.9	$16.0	$41.8	$942.1
GF total	$6,932	$8,656	$99,402	$2,751	$2,078	$5,709	$7,213	$5,329	$15,749	$153,819
%	0.63%	0.05%	0.72%	0.57%	2.75%	0.15%	0.57%	0.30%	0.27%	0.61%

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Table B-1. continued.

	AK	AZ	CA	ID	MT	NM	OR	UT	WA	TOTAL
2014										
GF wildfire	$29.4	$4.0	$1,075.1	$27.7	$11.6	$2.3	$14.7	$7.7	$25.3	$1,197.9
GF total	$5,390	$8,338	$103,375	$2,815	$2,077	$6,041	$7,612	$5,420	$16,383	$157,451
%	0.55%	0.05%	1.04%	0.98%	0.56%	0.04%	0.19%	0.14%	0.15%	0.76%
2015										
GF wildfire	$75.0	$4.0	$1,286.1	$60.2	$4.6	$1.6	$23.9	$5.4	$73.6	$1,534.4
GF total	$2,257	$8,934	$111,789	$3,057	$2,200	$6,237	$8,418	$5,805	$17,283	$165,980
%	3.32%	0.04%	1.15%	1.97%	0.21%	0.03%	0.28%	0.09%	0.43%	0.92%

Data sources: State wildfire agencies and NASBO (annual reports).