



Testimony

Before the Committee on Energy and  
Natural Resources, U.S. Senate

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# WILDLAND FIRE MANAGEMENT

## Agencies' Efforts to Assess Program Effectiveness and Modernize the Firefighting Aviation Fleet

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# GAO Highlights

Highlights of [GAO-16-217T](#), a testimony before the Committee on Energy and Natural Resources, U.S. Senate

## Why GAO Did This Study

Wildland fires play an important ecological role on the landscape, but they cost billions each year, result in loss of life, and cause damage to homes and other structures. The Forest Service and Interior are responsible for wildland fire management on federal lands, including acquiring firefighting assets such as large airtankers to assist in fire suppression activities. Increased fire intensity has prompted efforts aimed at implementing more effective fire management strategies.

Understanding the effectiveness of these efforts takes on heightened importance given that the Forest Service and Interior have obligated \$8.3 billion to suppress wildland fires in fiscal years 2009 through 2014.

This testimony is based on GAO reports issued in September 2015 and August 2013. It focuses on (1) how the federal wildland fire agencies assess the effectiveness of their wildland fire management programs and (2) Forest Service efforts to modernize the large airtanker fleet and challenges it faces in doing so. For the 2015 report, GAO reviewed agency performance measures and other ways the agencies assess effectiveness. For the 2013 report, GAO reviewed large airtanker planning and acquisition documents. GAO also conducted selected updates by reviewing documentation and interviewing officials.

## What GAO Recommends

GAO recommended in September 2015 that the agencies develop specific criteria for reviewing wildland fires. The agencies generally agreed. GAO is not making any new recommendations in this testimony.

View [GAO-16-217T](#). For more information, contact Anne-Marie Fennell at (202) 512-3841 or [fennella@gao.gov](mailto:fennella@gao.gov)

November 17, 2015

## WILDLAND FIRE MANAGEMENT

### Agencies' Efforts to Assess Program Effectiveness and Modernize the Firefighting Aviation Fleet

## What GAO Found

As GAO found in its September 2015 report, the Department of Agriculture's Forest Service and the Department of the Interior assess the effectiveness of their wildland fire management programs in several ways, including through performance measures, evaluations of particular activities, and reviews of specific wildland fires. Forest Service and Interior officials told GAO their performance measures need to be improved and that they are working to do so. For example, in fiscal year 2014, the Forest Service began developing a performance measure intended to reflect that, in some cases, allowing naturally-ignited fires to burn can provide natural resource benefits at a lower cost and lower risk to personnel than fully suppressing the fire as quickly as possible. Officials told GAO they plan to finalize the measure and use it in 2017. In addition, Forest Service and Interior have undertaken efforts to evaluate particular wildland fire management activities, such as efforts to reduce potentially hazardous vegetation that can fuel fires, known as fuel reduction, and assess the performance of firefighting aircraft. However, GAO's 2015 report found that the Forest Service and Interior conducted reviews to assess their effectiveness in responding to wildland fire, but did not consistently follow agency policy which generally directs them to review each fire involving federal expenditures of \$10 million or more. Forest Service and Interior officials told GAO that this policy overly emphasized the cost of wildland fire suppression rather than the effectiveness of their response to fires. However, the Forest Service and Interior have not established specific criteria for selecting fires for review and conducting the reviews. For example Forest Service officials told GAO the agency judgmentally selects incidents to review based on broad criteria such as complexity and national significance. By developing specific criteria, GAO concluded that the agencies may enhance their ability to help ensure that their fire reviews provide useful information about the effectiveness of their wildland fire activities.

In its August 2013 report, GAO found that the Forest Service faced challenges in modernizing the government's fleet of large airtankers—which had declined from 44 in 2002 to 8 in 2013—but since that report the agency has increased the availability of such aircraft. GAO found in 2013 that the Forest Service, which is responsible for contracting for large airtankers, planned to modernize the fleet by obtaining large airtankers from various sources over the near, medium, and long term, but that each component of that approach faced challenges, making the continued availability of such aircraft to meet fire suppression needs uncertain. For example, for the medium term, the Forest Service had awarded contracts for seven "next-generation" large airtankers, but as of August 2013 only one had completed necessary federal approval and certification processes. Since that report, Forest Service officials told GAO that the agency has increased the availability of large airtankers. Specifically, as of November 2015, the agency had contracted for 20 privately-owned large airtankers, and another 7 large airtankers are to be transferred to Forest Service ownership from the Coast Guard.

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Chairman Murkowski, Ranking Member Cantwell, and Members of the Committee:

I am pleased to be here today to discuss our recent work on federal wildland fire management. As you know, wildland fires have resulted in tragic loss of life and damage to homes, infrastructure, and important cultural and natural resources. The 2015 fire season has been especially severe, with over 9 million acres burned to date—well over the annual average of about 6.5 million acres burned during each of the last 10 years. However, wildland fire also plays an important ecological role in maintaining healthy ecosystems, with many ecosystems being adapted to or dependent upon fire. Balancing the need to suppress unwanted wildland fires to protect people and resources with the need to recognize fire’s natural role on the landscape is a complex task, particularly given the current condition of the nation’s landscape, increased development in and around wildlands (an area often called the wildland-urban interface), and the future outlook for wildland fires. For example, changing climate conditions, including drier conditions in certain parts of the country, have increased the length and severity of wildfire seasons, according to many scientists and researchers; in the western United States, the average number of days in the fire season has increased from approximately 200 in 1980 to approximately 300 in 2013.<sup>1</sup>

Five federal land management agencies—the Forest Service within the Department of Agriculture and the Bureau of Indian Affairs, Bureau of Land Management, Fish and Wildlife Service, and National Park Service within the Department of the Interior—are responsible for managing wildland fires on federal lands. The agencies’ wildland fire management program has three primary components: preparedness, suppression, and fuel reduction.<sup>2</sup> To prepare for a wildland fire season, the agencies acquire firefighting assets—including firefighters, fire engines, aircraft,

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<sup>1</sup>Booz Allen Hamilton, *2014 Quadrennial Fire Review* (Washington, D.C.: May 2015). The states included in this statistic were Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming. See also National Research Council, *Climate Change: Evidence, Impacts, and Choices. Answers to Common Questions about the Science of Climate Change* (Washington, D.C.: 2012) and U.S. Climate Change Science Program, *The Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity in the United States* (Washington, D.C.: May 2008).

<sup>2</sup>Other fire program components include prevention; science, research, and development; site rehabilitation; and assistance to nonfederal entities.

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and other equipment—and station them at individual federal land management units or at centralized dispatch locations in advance of expected wildland fire activity. When a fire starts, interagency policy calls for the agencies to consider land management objectives and the structures and resources at risk when determining whether or how to suppress it. A wide spectrum of strategies is available to choose from, and the land manager at the affected local unit is responsible for determining which strategy to use—from conducting all-out suppression efforts to monitoring fires within predetermined areas in order to provide natural resource benefits. Fuel reduction refers to agencies' efforts to reduce potentially hazardous vegetation that can fuel fires, in an effort to reduce the potential for severe wildland fires, lessen the damage they cause, limit the spread of flammable invasive species, and restore and maintain healthy ecosystems. The agencies use multiple approaches for reducing this vegetation, including setting fires under controlled conditions (prescribed burns), mechanical thinning, herbicides, certain grazing methods, or combinations of these and other approaches.

As part of their wildland fire management efforts, the agencies rely on firefighting aircraft—including fixed-wing airtankers, helicopters, and other aircraft—to assist in wildland fire suppression activities. Aircraft are used to conduct surveillance, deliver supplies, and drop retardant or water to extinguish or slow the growth of fires. In using aircraft, the agencies largely rely on private vendors that own and operate the aircraft under contract to the government. Among firefighting aircraft, large airtankers—those able to carry at least 1,800 gallons of fire retardant—are key resources for the agencies because of their ability to fly to remote areas and quickly assist in containing small fires before they become larger, costlier, and more dangerous. The Forest Service is responsible for contracting for large airtankers, although they may be used by any of the agencies. However, the number of large airtankers available under federal contract decreased substantially from 2002, when 44 large airtankers were available, to 2013, when 8 were available. The decrease in large airtankers was, in part, the result of aircraft being retired due to their age—in 2013, the average large airtanker was more than 50 years old—as well as agencies' concerns about the airtankers' safety and capability to perform the demanding fire aviation mission.

In recent decades, increased wildland fire intensity has prompted new policies and efforts aimed at implementing more effective management strategies to manage wildland fire. For example, in response to significant fire events, the agencies developed the Federal Wildland Fire Management Policy of 1995, under which the agencies continued to

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move away from their earlier emphasis on suppressing every wildland fire, seeking instead, among other things, to respond to fires in ways that protect communities and important resources while considering both the cost and long-term effects of the response. The most recent guidance for the implementation of this policy was issued in 2009. As we found in our September 2015 report,<sup>3</sup> this guidance provided managers with more flexibility in responding to wildland fires by allowing them to consider different options for response. According to agency documents, the guidance was intended to reduce barriers to risk-informed decision making, allowing the response to be more commensurate with the risk posed by the fire, the resources to be protected, and the agencies' land management objectives. The issuance of the 2009 guidance was one of several key changes the agencies had made in their approach to wildland fire management, in part to reflect this risk-based approach. Also, in that report we found that the agencies were working to distribute their fire management resources in ways that better reflect current conditions rather than continuing to rely primarily on historical funding amounts. These efforts take on greater importance in light of constrained budgets and the amount spent by federal agencies on wildland fire management. For example, the Forest Service and Interior obligated \$8.3 billion to suppress wildland fires in fiscal years 2009 through 2014. In addition, according to a 2015 report by Forest Service researchers, the amount the Forest Service spends on wildland fire management has increased from 17 percent of the agency's total funds in 1995 to 51 percent of funds in 2014<sup>4</sup>—highlighting the importance of the agencies understanding the effectiveness of their wildland fire management programs.

My statement today focuses on (1) how the federal wildland fire management agencies assess the effectiveness of their wildland fire management programs and (2) the Forest Service's efforts to modernize the large airtanker fleet and challenges it has faced in doing so. This testimony is based primarily on reports we issued in September 2015 and

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<sup>3</sup>GAO, *Wildland Fire Management: Agencies Have Made Several Key Changes but Could Benefit from More Information about Effectiveness*, [GAO-15-772](#) (Washington, D.C.: Sept. 16, 2015).

<sup>4</sup>David E. Calkin, Matthew P. Thompson, and Mark A. Finney, "Negative Consequences of Positive Feedbacks in U.S. Wildfire Management," *Forest Ecosystems*, vol. 2, no. 9 (2015).

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August 2013.<sup>5</sup> To examine how federal wildland fire management agencies assess program effectiveness, we reviewed documents, such as agency strategic plans, budget justifications, agency studies and strategy documents related to fire aviation, and reports resulting from fire reviews conducted by the agencies since 2009. We interviewed agency officials to identify key performance measures and other mechanisms the agencies use to determine the effectiveness of their wildland fire management programs and to understand agency efforts to identify their firefighting aircraft needs, including their use of information on performance and effectiveness. We also reviewed legislative and agency direction related to fire reviews and compared agency practices for conducting fire reviews with direction contained in relevant agency policy. To examine the Forest Service's efforts to modernize the large airtanker fleet, we reviewed agency documents related to large airtanker acquisition, management, and operations, as well as planning and acquisition documents. We also interviewed members of the fire aviation stakeholder community, including state officials, vendors that own and operate large airtankers, and national trade organizations. More details on the scope and methodology for this work can be found in each of our issued reports. In addition, this testimony includes selected updates we conducted in November 2015 on actions the agencies have taken since our 2013 report. To conduct the updates, we reviewed agency documentation, including documents related to firefighting aircraft, and interviewed Forest Service and Interior officials.

We conducted the work on which this testimony is based in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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<sup>5</sup>[GAO-15-772](#) and GAO, *Wildland Fire Management: Improvements Needed in Information, Collaboration, and Planning to Enhance Federal Fire Aviation Program Success*, [GAO-13-684](#) (Washington, D.C.: Aug. 20, 2013).

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## Agencies Assess the Effectiveness of Their Programs in Several Ways but Have Not Consistently Conducted Reviews That Could Improve Responses to Fires

In our September 2015 report, we found that the agencies assess the effectiveness of their wildland fire management programs in several ways, including through performance measures, efforts to assess specific activities, and reviews of specific wildland fire incidents. We found that both the Forest Service and Interior were developing new performance measures, in part to help better assess the results of their current emphasis on risk-based management, according to agency officials.<sup>6</sup> In addition, the agencies have undertaken multiple efforts to assess the effectiveness of activities such as fuel reduction treatments and aerial firefighting. We also found that the agencies had conducted reviews of their responses to wildland fires, but that they did not consistently follow agency policy in doing so or use specific criteria for selecting the fires they reviewed, limiting their ability to help ensure that their fire reviews provided useful information and meaningful results.

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## Agencies Use Various Performance Measures to Assess Wildland Fire Management

As we found in our September 2015 report, both the Forest Service and Interior use various performance measures, such as the number of acres treated to reduce fuels and the percentage of wildland fires contained during initial attack,<sup>7</sup> to assess their wildland fire management effectiveness. These measures are reported in, among other things, the agencies' annual congressional budget justifications. Officials from both the Forest Service and Interior, however, told us their performance measures need improvement to more appropriately reflect their emphasis on a risk-based approach to wildland fire management and, in June 2015, officials from both agencies told us that they were working to improve them. For example, in fiscal year 2014, the Forest Service began developing a performance measure intended to reflect that, in some cases, allowing naturally-ignited fires to burn can provide natural resource benefits at a lower cost and lower risk to personnel than fully suppressing the fire as quickly as possible.<sup>8</sup> Forest Service officials told us they are working with field units to evaluate whether this measure will effectively assess their efforts to implement a risk-based approach to fire management, and said they will adjust it as needed. The officials told us

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<sup>6</sup>[GAO-15-772](#).

<sup>7</sup>"Initial attack" refers to the initial efforts to suppress a wildland fire, generally encompassing the first 24 hours after a fire is reported.

<sup>8</sup>The performance measure is "Percent of acres burned by natural ignition with resource benefits."

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they plan to finalize the measure and use it in 2017. Similarly, in fiscal year 2014 Interior began using a new performance measure intended to better reflect the variety of strategies, in addition to all-out suppression efforts, available to respond to wildland fires.<sup>9</sup>

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### Agencies Have Undertaken Multiple Efforts to Assess Effectiveness of Specific Activities

The agencies have also undertaken multiple efforts to assess the effectiveness of particular wildland fire management activities, such as fuel reduction and aerial firefighting. Regarding fuel reduction activities, in prior work we found that demonstrating the effectiveness of fuel reduction treatments is inherently complex and that the agencies did not have sufficient information to evaluate fuel treatment effectiveness, such as the extent to which treatments changed fire behavior.<sup>10</sup> Without such information, we concluded that the agencies could not ensure that fuel reduction funds were directed to the areas where they can best minimize risk to communities and natural and cultural resources. Accordingly, we recommended in 2007 that the agencies take actions to develop additional information on fuel treatment effectiveness. The agencies agreed with this recommendation and have taken steps to address it. In our September 2015 report, we found that the agencies are continuing efforts to improve their understanding of fuel treatment effectiveness. For example, the Forest Service and Interior agencies use a system called Fuel Treatment Effectiveness Monitoring to assess fuel reduction treatment effectiveness.<sup>11</sup> The Forest Service began requiring such assessments in 2011, and Interior requested such assessments be

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<sup>9</sup>The performance measure is “Percent of wildfires on [Department of the Interior]-managed landscapes where the initial strategy (ies) fully succeeded during the initial response phase.”

<sup>10</sup>GAO, *Wildland Fire Management: Better Information and a Systematic Process Could Improve Agencies’ Approach to Allocating Fuel Reduction Funds and Selecting Projects*, [GAO-07-1168](#) (Washington, D.C.: Sept. 28, 2007) and GAO, *Wildland Fire Management: Federal Agencies Have Taken Important Steps Forward, but Additional, Strategic Action Is Needed to Capitalize on Those Steps*, [GAO-09-877](#) (Washington, D.C.: Sept. 9, 2009).

<sup>11</sup>Fuel Treatment Effectiveness Monitoring is a program to evaluate the effectiveness of prescribed fire and mechanical treatments designed to reduce the risk of wildfire. Forest Service and Interior agencies conduct assessments in instances where a wildfire either starts within or burns into an area that has been treated, to evaluate the resulting impacts on fire behavior and fire suppression actions. We have not assessed the agencies’ implementation of this effort.



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completed starting in 2012.<sup>12</sup> Under this approach, the agencies are to complete a monitoring report whenever a wildfire interacts with an area where a fuel reduction treatment was previously conducted.

Regarding aerial firefighting, in our August 2013 report, we found that Forest Service and Interior had not collected information on the performance and effectiveness of firefighting aircraft as part of their efforts to identify their firefighting aircraft needs.<sup>13</sup> Specifically, we found that the agencies had not established data collection mechanisms to track the specific tactical uses of firefighting aircraft—for example, where retardant or water is dropped in relation to a fire as well as the objective of a drop, such as protecting a structure—or measure their performance and effectiveness in those uses. Since the 1960s, multiple reviews of federal fire aviation programs have called for the Forest Service and Interior to collect information on the performance of firefighting aircraft. At the time of our 2013 report, the Forest Service had recently begun an effort known as the Aerial Firefighting Use and Effectiveness Study to address this concern. We noted, however, that this study focused on large airtankers (which, as noted, are managed by the Forest Service) and that Interior did not have plans to collect performance information on the types of firefighting aircraft it manages. Accordingly, in that report we recommended that the agencies expand efforts to collect information on aircraft performance and effectiveness to include all types of firefighting aircraft in the federal fleet. The agencies generally agreed with our recommendation.

In our September 2015 report, we found that the Forest Service and Interior were jointly implementing the Aerial Firefighting Use and Effectiveness Study begun in 2012. According to the study website and agency officials, the agencies are collecting information on how aerial retardant and suppressant delivery affects fire behavior, and they plan to use this and other collected information to track the performance of

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<sup>12</sup>The Interior agencies each issued their own guidance related to Fuel Treatment Effectiveness Monitoring. The National Park Service issued guidance in 2012, Bureau of Indian Affairs in 2013, Bureau of Land Management in 2014, and Fish and Wildlife Service in 2015.

<sup>13</sup>[GAO-13-684](#).

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specific aircraft types.<sup>14</sup> As of November 2015, according to agency officials, the agencies had collected data on aircraft use in more than 100 fires as part of the study. In addition, according to these officials, as part of the study the agencies are developing specific ways to assess firefighting aircraft performance effectiveness to be used during the 2016 fire season. Agency officials told us the study is not a one-time activity but is an ongoing effort to continually provide information to help improve their use of firefighting resources.<sup>15</sup>

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## The Forest Service and Interior Agencies Have Not Consistently Conducted Reviews of Wildland Fire Incidents to Assess their Effectiveness

As detailed in our September 2015 report, the Forest Service and the Interior agencies have conducted reviews to assess their effectiveness in responding to wildland fires, but have not consistently followed agency policy in doing so and did not always use specific criteria for selecting the fires they reviewed. Congressional committee reports and agency policy have generally called for the agencies to review their responses to wildland fires involving federal expenditures of \$10 million or more, in part to help understand how to better contain suppression costs.<sup>16</sup> The agencies, in turn, have each developed their own policies that generally direct them to review each fire that exceeds the \$10 million threshold and, in some cases, those policies note that fire reviews may be conducted for other purposes, such as where the fire raised significant political, social, natural resource, or policy concerns.

The agencies have not consistently conducted reviews of fire incidents meeting the \$10 million threshold, in part because, according to officials, doing so does not reflect the agencies' focus on assessing the effectiveness of their response to fire. However, the agencies have not developed specific criteria for selecting fire incidents for review. Forest Service officials told us that rather than selecting all fires with federal

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<sup>14</sup><http://www.fs.fed.us/fire/aviation/afue/index.html>, accessed July 31, 2015. Aircraft types involved in the study include fixed-wing airtankers, certain types of helicopters, and other aircraft.

<sup>15</sup>As of November 2015, we had not obtained documentation to determine the extent to which the agencies' actions are responsive to our 2013 recommendation.

<sup>16</sup>In fiscal years 2003 through 2010, congressional committee reports directed the Forest Service and Interior to conduct reviews of large fire incidents generally for the purpose of understanding how to better contain suppression costs; beginning in fiscal year 2006, these reports included a cost threshold, specifying that such reviews be conducted for fires involving federal expenditures of \$10 million or more.

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expenditures of \$10 million or more to review, they changed their selection approach. These officials told us that focusing exclusively on suppression costs when selecting fires may keep the agency from choosing those fires where it can obtain important information and best assess management actions and ensure they are appropriate, risk-based, and effective. Instead, Forest Service officials told us the agency judgmentally selects incidents to review based on a range of broad criteria, such as complexity and national significance, taking into account political, social, natural resource, or policy concerns. Using these broad selection criteria, the Forest Service reviewed 5 wildland fires that occurred in 2012 and 10 that occurred in 2013. However, with these broad criteria it is not clear why the Forest Service selected those particular fires and not others. For example, the 2013 Rim Fire, which burned more than 250,000 acres and cost more than \$100 million to suppress—by far the costliest fire to suppress that year—was not among the 2013 fires selected for review.<sup>17</sup> Moreover, the reviews completed for each of those years did not use consistent or specific criteria for conducting the reviews. As of July 2015, the agency had not selected fires to review from the 2014 wildland fire season and, when asked, agency officials did not indicate a time frame for doing so.

Forest Service officials told us they believe it is appropriate to judgmentally select fires to provide them flexibility in identifying which fires to review and which elements of the fire response to analyze. Nevertheless, Forest Service officials also acknowledged the need to develop more specific criteria for selecting fires to review and conducting the reviews. In July 2015, officials told us they were working to update their criteria for doing so. They provided us a draft update of the Forest Service policy manual, but this draft did not contain specific criteria for selecting fires for review or conducting the reviews. Moreover, officials did not provide a time frame for completing their update.

Within Interior, Bureau of Land Management officials told us that the agency completed its last fire review based on significant cost (i.e., federal expenditures of \$10 million or more) in 2013. These officials told us that the Bureau of Land Management, similar to the Forest Service, plans to shift the emphasis of its fire reviews to evaluate management

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<sup>17</sup>The Rim Fire burned about 154,000 acres of Forest Service land, about 79,000 acres of National Park Service land, and about 23,000 acres of private land.

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actions rather than focusing on cost, and that officials are working to determine criteria for selecting fires for review. Interior headquarters officials told us that the Fish and Wildlife Service and National Park Service have continued to follow the direction provided through their policies regarding reviews of fires that met the \$10 million threshold. Interior headquarters officials, however, acknowledged the need to improve Interior's approach to selecting fires for review to focus more on information about decision making rather than fire costs. In July 2015, the officials told us they planned to develop criteria other than cost for use by all Interior agencies in selecting fires to review, and that they planned to develop standard criteria for implementing the reviews, but they did not provide information about how they planned to develop such criteria or the factors they would consider.

Agency reports have likewise cited the need to improve both the processes for selecting fires for review and the implementation of the reviews. A 2010 report, for example, noted the importance of improving the selection of fires to review and stated that the agencies would benefit from a more productive review strategy.<sup>18</sup> The report said the agencies' existing approach to conducting reviews tended to produce isolated efforts and unrelated recommendations rather than establishing a consistent foundation for continuous improvement. A 2013 report assessing the usefulness of the Forest Service's five reviews of 2012 fires noted shortcomings in consistency across the reviews, including unclear criteria for selecting fires and conducting reviews, as well as limitations in the specificity of the resulting reports and recommendations.<sup>19</sup> Our previous body of work on performance management has shown that it is important for agencies to collect performance information to inform key management decisions, such as how to identify problems and take corrective actions and how to identify and share effective approaches.<sup>20</sup> We concluded that, by developing specific criteria for selecting fires for

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<sup>18</sup>U.S. Department of Agriculture Independent Large Fire Cost Review Panel and Guidance Group, Inc., *Large Fire Cost Review for 2009* (August 2010).

<sup>19</sup>Wildland Fire Lessons Learned Center, *Lessons From Recent Large Fire Reviews: Briefing Paper* (August 7, 2013). There was no similar analysis performed of the Forest Service's 10 reviews of fires occurring in 2013.

<sup>20</sup>See GAO, *Managing for Results: Enhancing Agency Use of Performance Information for Management Decision Making*, [GAO-05-927](#) (Washington, D.C.: Sept. 9, 2005); GAO, *Nanotechnology: Improved Performance Information Needed for Environmental, Health, and Safety Research*, [GAO-12-427](#) (Washington, D.C.: May 21, 2012); and [GAO-13-684](#).

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review and conducting the reviews, the agencies may enhance their ability to obtain useful, comparable information about their effectiveness in responding to wildland fires, which, in turn, may help them identify needed improvements in their wildland fire approach. As a result, we recommended in our September 2015 report that the Secretaries of Agriculture and the Interior direct the Chief of the Forest Service and the Director of Interior's Office of Wildland Fire to (1) develop specific criteria for selecting wildland fires for review and for conducting the reviews as part of their efforts to improve their approach to reviewing fires and (2) once such criteria are established, revise agency policies to align with the specific criteria developed by the agencies. In their written comments on our report, the agencies generally agreed with our recommendations and stated that they were developing criteria for selecting fires to review and conducting reviews.

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## The Forest Service Has Faced Challenges in Its Efforts to Modernize the Large Airtanker Fleet, but Has Increased the Availability of Large Airtankers Since Our 2013 Report

In our August 2013 report, we found that the Forest Service faced challenges in modernizing the government's fleet of large airtankers—which had declined from 44 in 2002 to 8 in 2013—but since that report the agency has increased the availability of such aircraft, with some challenges remaining. Specifically, we found that the Forest Service planned to modernize the large airtanker fleet by obtaining large airtankers from various sources over the near, medium, and long terms, but that each component of this approach faced challenges that made the continued availability of such aircraft to meet national fire suppression needs uncertain.<sup>21</sup> Since that report, some of these challenges remain, while others are no longer relevant. In addition, the Forest Service has increased the availability of large airtankers, in part by increasing the number of airtankers under contract.

We found in our 2013 report that, in the near term, the agency planned to rely on a mix of contracted “legacy” airtankers, including several P-2V Neptune aircraft—Korean War-era maritime patrol aircraft—as well as supplemental aircraft available through additional contracts and agreements with the military and with other governments.<sup>22</sup> However,

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<sup>21</sup>[GAO-13-684](#).

<sup>22</sup>The Forest Service and Interior have established agreements with the military and with other governments, such as those of Canada and the State of Alaska, to augment the national firefighting aircraft fleet during periods of heavy fire activity.

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agency concerns existed regarding the availability, capability, and costs of these resources. For example, the agency had seven P-2V Neptune aircraft under contract, the ages of which made their availability throughout the entire 5-year contract period uncertain. Specifically, aircraft vendors told us they might need to retire some aircraft prior to the end of the contract period because of the cost of maintaining the aging aircraft. As of November 2015, six P-2V Neptune aircraft remained under contract to the Forest Service.<sup>23</sup>

For the medium term, the Forest Service had awarded contracts for seven “next-generation” large airtankers that were expected to be faster and more up-to-date than the legacy aircraft. However, at the time of our 2013 report, it was uncertain when those aircraft would begin supporting fire suppression activities, in part because bid protests had delayed contract issuance and, at the time of that report, only one had completed necessary federal approval and certification processes to support fire suppression activities. Since then, according to Forest Service officials, six of these seven aircraft have completed the needed approval and certification processes.<sup>24</sup> The Forest Service has issued additional contracts for next-generation aircraft and, as of November 2015, the agency had a total of 20 privately-owned large airtankers under contract, according to Forest Service officials.<sup>25</sup> Seven of these airtankers were added under contract in September 2015.

For the long term, the Forest Service’s plan included a shift from the agency’s long-standing practice of contracting for, rather than owning, aircraft. Specifically, the Forest Service had indicated its long-term intention to obtain up to 14 Alenia C-27J Spartan transport aircraft through intergovernmental transfer at no initial cost if they were declared surplus by the military and to purchase other airtankers. In our 2013 report, however, we found that challenges existed regarding the retardant

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<sup>23</sup>The seventh P-2V was damaged during a landing in 2014 and is no longer under contract, according to a Forest Service official.

<sup>24</sup>Two of the aircraft received interim certification and are awaiting final certification, according to a Forest Service official.

<sup>25</sup>The Forest Service contracted for these aircraft using exclusive-use contracts, which require a vendor to provide an aircraft for service on any day covered by a “mandatory availability period” stipulated by the contract. The agency can access additional aircraft using call-when-needed contracts, which allows the government to pay for firefighting aircraft only when they are used.

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capacity and operating cost of the C-27J transport aircraft the Forest Service was to obtain through intergovernmental transfer, and that the Forest Service had been unable to justify previous plans for purchasing large airtankers to the Office of Management and Budget. Regarding intergovernmental transfer, the Forest Service had expressed interest in obtaining up to 14 Alenia C-27J Spartan transport aircraft from the Department of Defense if they were declared surplus equipment. Since our report, the National Defense Authorization Act of 2014 required a different intergovernmental transfer than that anticipated by the Forest Service—thereby making the challenge we identified with the C-27J transport aircraft no longer relevant.<sup>26</sup> Rather than transferring the C-27J transport aircraft to the Forest Service, section 1098 of the act directs the Coast Guard to transfer seven Lockheed Martin HC-130H Hercules aircraft to the Forest Service for use in wildfire suppression.<sup>27</sup> According to Forest Service officials, none of these aircraft have been transferred as of November 2015; these officials told us they expect the aircraft will be transferred to the Forest Service between 2017 and 2019. One aircraft, however, was used by the Forest Service during the 2015 wildland fire season under an agreement with the Coast Guard, according to Forest Service officials. The Forest Service equipped that aircraft with a Modular Airborne Firefighting System (MAFFS) unit—a portable, pressurized retardant delivery system.<sup>28</sup> However, as we found in our 2013 report, Forest Service and Interior officials expressed concern that MAFFS performance can be inadequate in some circumstances.<sup>29</sup> Forest Service officials told us the agency intends to operate one HC-130H aircraft with

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<sup>26</sup>Pub. L. No. 113-66, 127 Stat. 881 (2013).

<sup>27</sup>The law directed that the aircraft first be transferred to the Air Force for certain needed modifications. Once these modifications are completed, the aircraft are then to be transferred to the Forest Service.

<sup>28</sup>The Forest Service has used MAFFS units to temporarily convert military C-130 aircraft into large airtankers when additional aerial firefighting capacity is needed, under an agreement with the Department of Defense. For more details on the MAFFS program, see [GAO-13-684](#).

<sup>29</sup>We noted in our 2013 report that some federal and state fire aviation officials told us that the retardant line dispersed by the MAFFS system is generally narrower than firefighters prefer, which can either allow a fire to jump across the retardant line or necessitate an additional drop to widen the line, if another aircraft is available. Additionally, some officials said the system is unable to penetrate dense forest canopies, thereby preventing the retardant from being effective when used in heavy timber. However, some federal and state officials told us that MAFFS can be used effectively on rangeland where grasses are the predominant fuel type.

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the MAFFS unit through the 2016 fire season, but the agency plans to equip all seven HC-130H aircraft with traditional gravity-fed retardant delivery systems. Forest Service officials told us that the expected service life of these aircraft is 6 to 12 years, after which time the Forest Service would likely need to invest in significant maintenance given the demands placed on the aircraft by the firefighting mission.

In another development since our 2013 report, the Consolidated and Further Continuing Appropriations Act, 2015,<sup>30</sup> included \$65 million “for the purpose of acquiring aircraft for the next-generation airtanker fleet to enhance firefighting mobility, effectiveness, efficiency, and safety.” In August 2015, the Forest Service issued draft specifications for aircraft it would consider purchasing in accordance with the act. In November 2015, Forest Service officials told us the Department of Agriculture is preparing a business case to demonstrate the feasibility of such a purchase as required by Office of Management and Budget guidance, but did not provide a time frame for its submission.

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Chairman Murkowski, Ranking Member Cantwell, and Members of the Committee, this completes my prepared statement. I would be pleased to respond to any questions that you may have at this time.

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## GAO Contact and Staff Acknowledgments

If you or your staff members have any questions about this testimony, please contact me at (202) 512-3841 or [fennella@gao.gov](mailto:fennella@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this statement. Other individuals who made key contributions to this testimony include Steve Gaty (Assistant Director), Ulana M. Bihun, Mark Braza, Richard P. Johnson, Kyle M. Stetler, and Kiki Theodoropoulos.

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<sup>30</sup>Pub. L. No. 113-235, 128 Stat. 2130 (2014).



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