WHAT COLOR IS YOUR NOMEX?: CATEGORIZING AND QUANTIFYING THE WILDLAND FIRE RESPONSE WORKFORCE

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This report is part of a series of work dedicated to identifying impediments to the growth, development, and retention of the wildland fire workforce, and offering policy recommendations as tools for addressing them. Stemming from a request from U.S. Senator Ron Wyden to Michael Wara for a report detailing the needs for building a "sustainable federal wildfire workforce" made during a Senate Budget Committee in March 2023, the Climate and Energy Policy Program published the report, Developing and Supporting the Federal Wildland Fire Workforce, in August 2023. The first in its series, the report was authored by Abigail A. Varney and Samuel Wallace-Perdomo of Stanford's Smoke Policy Practicum, and addressed issues pertaining to firefighter compensation and classification, work-life balance, and health and wellbeing, as well as the need for mitigating the severity of contemporary firefighting work by reorienting the government's approach to wildfire towards proactive, stewardship-focused management. A second report, Building a Robust and Representative Wildland Fire Mitigation and Management Workforce, authored by Varney and Cassandra Jurenci, was published in November 2024 and offers recommendations for how policy could better support firefighters – particularly those who are underrepresented in the wildfire workforce – in entering and finding meaningful careers in this field. This report zooms out from the federal wildland fire workforce, to examine the role and capacity of each segment of the workforce – federal, Tribal, state, local, and private – in the fire response system.

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EXECUTIVE SUMMARY

Experts have acknowledged that there is "imperfect data on the full composition of the wildfire risk reduction, response, and recovery workforce."[1] In this paper, we improve upon the data available around the wildfire response workforce, specifically by quantifying the capacity and examining recent trends associated with this workforce. The fire response workforce is spread between federal, state, Tribal, local, and private agencies. While these sectors work together through a fire response system that emphasizes resource coordination, sharing, and interoperability, there is no one system that accounts for each individual firefighter across agencies participating in fire response. Rather, personnel qualifications and mobilizations are tracked differently depending on a person's employer, employment type, the type of incident to which they are responding, and in what capacity they are assisting response. Not only do these variations contribute to the imperfect data on the fire response workforce, but each segment of the workforce also has a unique history, operating context, set of values and norms, and fire protection responsibility that present additional challenges in quantifying workforce composition.

The lack of data on the full size and composition of the fire response workforce hinders critical analyses needed to inform policy decisions. At the fire response system level, imperfect data on workforce composition may obscure the availability of potential resources at a time when they are most needed to help address the wildfire crisis. At the personnel level, it may leave certain segments of the workforce vulnerable to unequal compensation, protection, and benefits. A better understanding of who is contributing to local, state, and national fire response is required to ensure that wildfire response frameworks and policy are effectively utilizing resources and properly accounting for the needs of a diverse workforce operating within unique environments.

Photo credit: drial7m1, iStock

1 Wildland Fire Mitigation and Management Commission, *On Fire: The Report of the Wildland Fire Mitigation and Management Commission*, i, 160, September 2023.

This paper quantifies the capacity present within each sector of the wildland fire workforce and describes the role it plays in fire response. First, we overview the wildfire response system and explain how wildfire response workforces are mobilized, shared, and scaled up. Next, we describe the size and function of each sector of the fire response workforce.[2] In this section we compare the total potential workforce employed by each sector with its utilization on large incidents. Key contributions and findings include:

- We estimate the size of the fire response workforce as:

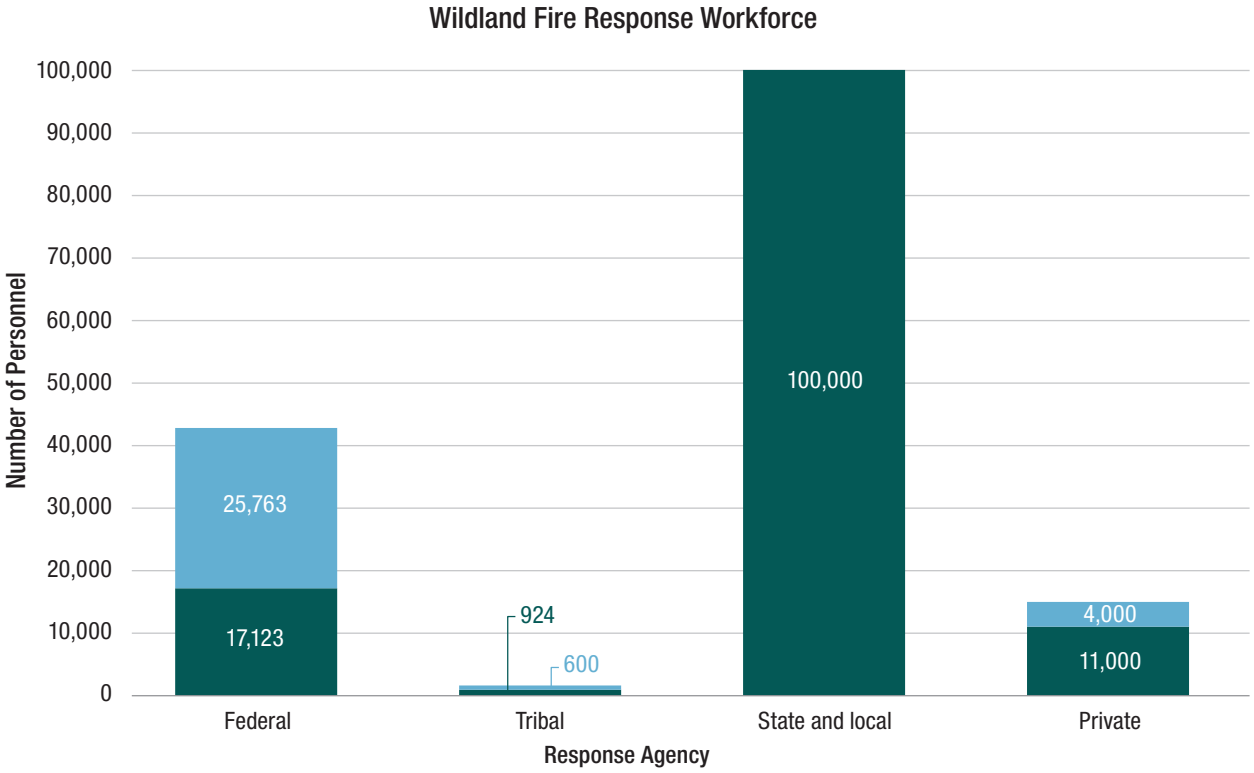

Figure 1. Wildland Fire Response Workforce. Response agency is broken down by federal, Tribal, state and local, and private to demonstrate the composition of the wildland fire response workforce. Personnel included in green are primary firefighters for federal or Tribal fire organizations; state, career or volunteer firefighters for state or local fire organizations; and professionally trained firefighters for private contractors.[3] Those included in the blue are supplemental firefighters or support service staff and contractors.

2 The numbers included in this section were determined through interviews with stakeholders across the federal, state, Tribal, local, and private fire services, in addition to a review of available data and literature.

3 See the *Wildland Fire Response Workforce* section on page 9 for definitions of these categories, as well as a more complete breakdown of the data included in Figure 1 by the relevant categories.

- **Federal.** 17,123 primary firefighters, 7,763 Administratively Determined hires, and over 18,000 secondary firefighters and collateral duty staff who are considered supplemental firefighters and support staff at the local unit level;
- **Tribal.** 924 primary firefighters, supplemented by an estimated 600 secondary firefighters and collateral duty staff;
- **State and local.** 100,000 firefighters employed across state fire organizations and local fire departments, supplemented by a workforce of many more career and volunteer firefighters serving departments that are responsible for wildland and wildland-urban interface fire response; and
- **Private.** 11,000 firefighters, supplemented by an estimated additional 4,000 contractors to provide incident management support services.

- The workforce is not solely or even mostly composed of federal wildland firefighters. Though federal partners played a key role in developing the national fire response system, the needs and capacity of the system have evolved and would likely benefit from better incorporating local resources. However, the system remains challenging for non-federal fire response entities to navigate.
- Certain segments of the workforce – in particular local, Tribal, and private fire organizations – have historically been undercounted and underrecognized within the fire response system.
- Private contractors are becoming an increasingly large segment of the wildland fire response workforce in the United States, especially for large incident response.

We end by proposing areas for future research to build on the findings of this paper.

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INTRODUCTION

Wildland fire response is an inter-agency effort, carried out by firefighters working across a diversity of sectors and employers. From the ready reserve who may never see the fireline to the firefighter working over 1,000 hours of overtime each season, from the federal firefighter frequently featured in popular discourse to the contract crew member or volunteer firefighter rendered nearly invisible by both media and policy, there exists huge variety in who makes up the wildfire response workforce. As the wildfire crisis grows more severe and the need for effective fire management more imperative, it is critical to properly understand how the current system of wildfire management works and who comprises the workforce that makes it run.

Experts have acknowledged that there is "imperfect data on the full composition of the wildfire risk reduction, response, and recovery workforce."[4] In this paper, we address this challenge within the fire response workforce in particular, which is a subset of the broader forestry workforce. Fire response is only one element of wildland fire management, which also includes pre-fire risk-reduction, community preparedness, and post fire recovery.[5] The workforces that carry out each of these efforts are often blended, with responsibilities that can include both fire mitigation and suppression depending on the time of year, level of fire activity, funding availability, and scope of the employer.[6] More simply put, most firefighters don't just put fires out, they also assist on prescribed fires, forest restoration projects, or fire mitigation around homes and communities, and the same happens in reverse.[7]

The fire response workforce is distributed across federal, state, Tribal, local, and private agencies. While these sectors work together through a fire response system that emphasizes resource coordination, sharing, and interoperability, there is no one system that accounts for each individual across agencies participating in fire response.[8] Rather, personnel qualifications and mobilizations are tracked differently depending on a person's employer, employment type, the type of incident they are responding to, and in what capacity they are assisting in response. Not only do these variations contribute to the imperfect data on the fire response workforce, but each segment of the workforce also has a unique history, operating context, set of values and norms, and fire protection responsibility that present additional challenges in quantifying workforce composition.

4 Wildland Fire Mitigation and Management Commission, *On Fire: The Report of the Wildland Fire Mitigation and Management Commission, supra* note 1, 160.

5 *Id.* at 157.

6 Varney and Wallace-Perdomo, *Developing and Supporting the Federal Wildland Fire Workforce,* 2023.

7 Maintaining an available workforce to respond to wildfires is frequently prioritized over accomplishing wildfire mitigation goals such as hazardous fuels reduction, which deflates capacity within the mitigation sectors to build landscape and community-scale resilience to wildfire. This paper contributes to the growing body of research developed to inform policy solutions to advance more effective fire response and a better supported firefighting workforce, however, holistically addressing the wildfire crisis will require increased investment in the arena of wildfire mitigation as well, to include commensurate investment in growing, supporting, and properly compensating dedicated mitigation workforces. For recommended solutions to develop a more robust and well-supported fire management workforce, please see the previous reports by the Stanford Climate and Energy Program: Varney and Jurenci, Building a Robust and Representative Fire Mitigation and Management Workforce, 2024; Varney and Wallace-Perdomo, Developing and *Supporting the Federal Wildland Fire Workforce,* 2023.

8 National Interagency Coordination Center, 2025 *National Interagency Standards for Resource Mobilization,* March 2025.

Federal, Tribal, and state agencies responsible for wildfire management rely on multiple workforces that can be activated to scale up their capacity as fire response needs grow. These agencies hire primary firefighters, whose job duties are to perform work directly connected with fire suppression.[9] They also employ people in secondary fire positions, who fill either administrative or supervisory positions within the field.[10] When necessary, non-fire staff or emergency hires may be mobilized temporarily to supplement the primary firefighting workforce in either operational or support roles.[11] This staffing model originated out of land management agencies' use of a single workforce to accomplish their mission, which included but was not limited to fire response.[12] Federal firefighters, for example, were long classified as Forestry Technicians, which was designed to be a utility position with diverse job duties related to resource management.[13] The increase in severity, frequency and duration of wildfires has led many Forestry Technician roles to become primarily fire response positions, though non-fire personnel are still routinely qualified and mobilized to perform incident management duties.[14]

The size and composition of the local and private fire services are also difficult to define. The local fire service is made up of a diversity of department types and a considerable portion of the workforce are volunteer firefighters. Some smaller fire departments have difficulty participating in resource coordination systems due to the high administrative burden posed on required training and qualifications, making it even more challenging to account for and leverage the wildfire response capabilities of local resources.[15] The private sector plays a large role in fire response, though it is often overlooked by the media and public. Federal agencies and most states contract out the majority of their aviation and heavy equipment resources, and private companies also provide firefighting crews and other incident management support services.[16] The private sector is more reliant on immigrant, undocumented, and foreign temporary workers, which contributes to a lack of available data and allows this workforce to be more easily marginalized from wildfire governance as it goes under-recognized.[17]

A better understanding of who is contributing to local, state, and national fire response is required to ensure that wildfire response frameworks and policy are effectively utilizing the total available resource pool and properly accounting for the needs of a diverse workforce operating within unique environments. It can also help illuminate the relationships between different sectors of the wildland fire response workforce, to analyze how changes (such as compensation, job availability, or career advancement opportunities) within one area of the workforce may impact others, for example, the retention of existing employees and the availability of new recruits.

9 U.S. Department of the Interior, Guidelines for Submitting Position Descriptions for Special Retirement Coverage.

10 *Id.*

11 Wildland Fire Mitigation and Management Commission, *supra* note 1, at 157.

12 Grassroots Wildland Firefighters, (Mis)Classification (Last accessed April 2, 2025).

13 *Id.*

14 *Id.*

15 *Id.* at 108.

16 Interview with George Geissler, State Forester and Deputy Supervisor of Wildland Fire Management, Washington Department of Natural Resources (Jan 29, 2025).

17 Wildland Fire Mitigation and Management Commission, *supra* note 1, at 159.

This paper quantifies the size and composition of the fire response workforce by federal, Tribal, state and local, and private sector, and describes the role that each play in fire response. First, we overview the wildfire response system and explain how wildfire response workforces are mobilized and utilized. Next, we describe the size and function of each sector of the fire response workforce.[18] In this section, we both approximate the size of the total potential workforce employed by each sector and show how each available workforce pool is being utilized by visualizing workforce composition by sector on large incidents. We end by proposing areas for future research to build on the findings of this paper.

Photo credit: ShaunL, iStock

18 The numbers included in this section were determined through interviews with stakeholders across the federal, state, Tribal, local, and private fire services, in addition to a review of available data and literature.

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THE WILDFIRE RESPONSE SYSTEM

Responsibility for fire protection is determined by land jurisdiction, authority, and ownership. Agencies charged with fire management are responsible for fire protection within their direct protection area as well as some lands legally under the jurisdiction of another entity as determined by off-set protection exchanges.[19] More effective response through cooperation is facilitated by a large web of agreements, contracts, and coordination systems that originated in the 1970s.[20] For example, states have cooperative fire agreements with federal agencies that provide for mutual and automatic aid, and most states also have similar agreements in place with the local fire service.[21] The party responsible for fire protection may also assume management and financial responsibility for a fire within their jurisdiction.[22]

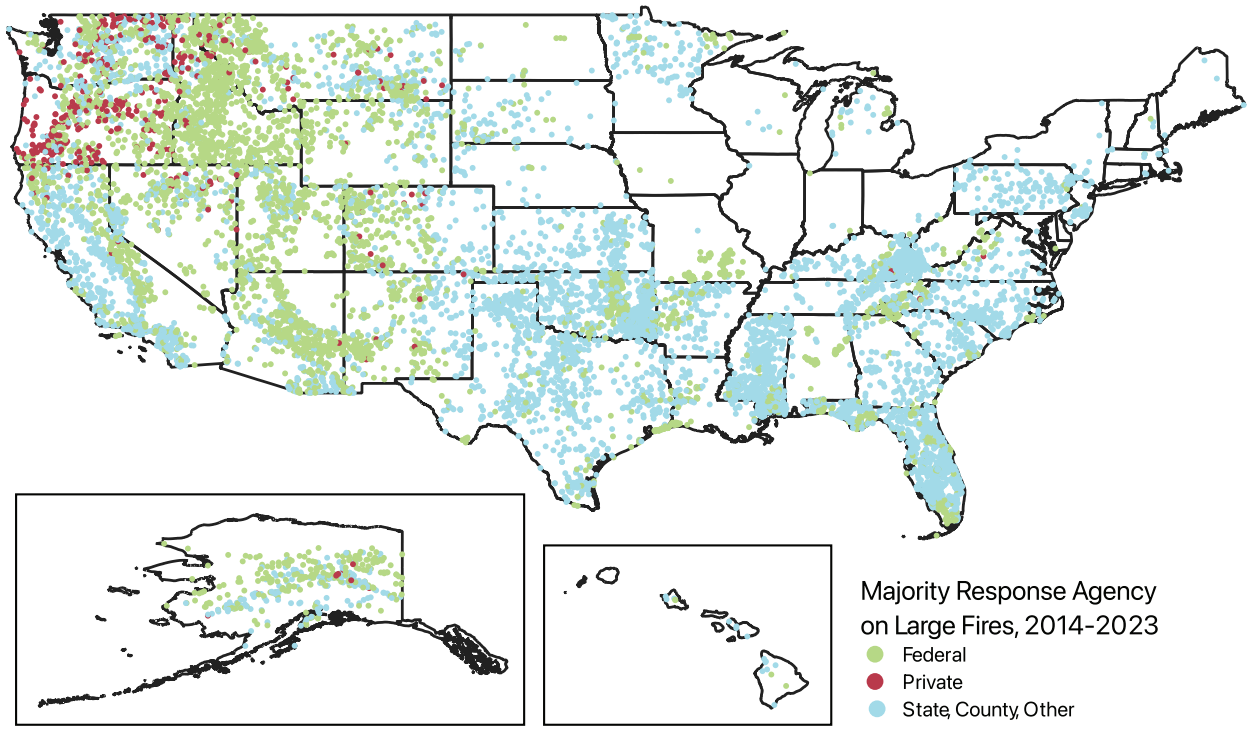

Figure 2. Map of the United States showing all large incidents from 2014-2023 by response agency that provided the majority of total personnel.[23] Response agency is broken down by federal,

19 Through off-set protections, fire protection agencies may exchange responsibility for fire protection of lands under their jurisdiction. The intent of off-set protections is to "create more efficient and effective response capabilities under the direct protection of a single agency, through the establishment of easily recognized protection boundaries and cost balancing." Rates of exchange are determined based on complexity and other factors. Donald K. Artley, *Wildland Fire Protection and Response in the United States: The Responsibilities, Authorities, and Roles of Federal, State, Local, and Tribal Government,* Int'l Ass'n of Fire Chiefs 1, 10, 2009.

20 Northwest Fire Science Consortium, *Incident Command System: A Framework for Effective Incident Management.*

21 Donald K. Artley, *Wildland Fire Protection and Response in the United States: The Responsibilities, Authorities, and Roles of Federal, State, Local, and Tribal Government, supra* note 19, 37.

22 *Id.*

23 Data for this figure is from Lise A. St. Denis et al., *All-Hazards Dataset Mined from the U.S. National Incident Management System 1999–2020,* 10 Sci. Data 112 (2023).

private, and state/county/other to demonstrate where certain responders are providing the majority of personnel to wildfire incidents. Total personnel includes hand crews, engines and heavy equipment, overhead, and aviation. While multiple agencies often respond to the same fires, jurisdictional responsibility, location and complexity of the incident, and levels of fire activity elsewhere in the nation are all factors in where resources are committed and from what response agency.

While wildland firefighters are employed by individual agencies and departments with specific missions and objectives, these workforces can be utilized as a shared resource capable of responding to incidents regardless of jurisdictional boundaries, due to the legal agreements mentioned above. These agreements also govern a three-tiered system to dispatch and coordinate wildfire response across the country at.[24] There are around 250 local dispatch centers around the United States to coordinate and monitor resource availability and response capability at the local level, 10 geographic area dispatching centers, and a single national center.[25] The nearest available resource is dispatched for initial attack[26] purposes at the local level, regardless of on whose jurisdiction the fire started.[27] Through mutual aid agreements, fire protection organizations agree to send fire personnel or equipment to an incident outside of their own jurisdiction when additional capacity is requested by another of the entities included in the agreement.[28] This allows initial responders to more easily scale up fire response when additional resources and support are needed.

If fire activity exceeds local capacity, the relevant Geographic Multiagency Coordinating Group (GMAC) assists in moving resources around the region.[29] The National Interagency Coordination Center (NICC) helps coordinate resource allocation nationally, and the National Multi-Agency Coordinating Group (NMAC) is stood up when fire activity or resource needs exceed local and geographic level capacity.[30] There are certain high-demand resources provided primarily by the federal government, including hotshot crews, large air tankers, and complex incident management teams, that are often coordinated at the national level in alignment with national priorities.[31]

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24 *Jessica Gardetto & Kim Van Hemelryck,* Behind the Scenes: Dispatching Wildland Firefighters Around the Country, United States Department of the Interior (last visited Apr. 30, 2025).

25 *Id.*

26 Initial attack describes the actions taken by the first responders to a wildland fire under a full suppression strategy to prevent further expansion of the fire. An extended attack incident is a wildland fire that has not been controlled and contained by responders during the initial attack phase, and whose size and/or complexity requires additional resources. The authors use both "extended attack" and "large fires/incidents" to characterize fires in the extended attack phase. U.S. Department of Agriculture, *Fire Terminology* (last visited Apr. 17, 2025).

27 Donald K. Artley, Wildland Fire Protection and Response in the United States: *The Responsibilities, Authorities, and Roles of Federal, State, Local, and Tribal Government, supra* note 19.

28 Donald K. Artley, Wildland Fire Protection and Response in the United States: *The Responsibilities, Authorities, and Roles of Federal, State, Local, and Tribal Government, supra* note 19, 10.

29 Jessica Gardetto & Kim Van Hemelryck, *Behind the Scenes: Dispatching Wildland Firefighters Around the Country, supra* note 24.

30 *Id.*

31 Interview with Alex Robertson, Director of Fire, Fuels, and Aviation, USDA Forest Service (February 5, 2025).

Participation in the formally coordinated national fire response system requires legal agreements, compacts, and cost-reimbursement structures which have proved difficult for both smaller, local entities and large organizations alike.[32] Federal agencies have ended many of these kinds of agreements at the local level due to their administrative complexity.[33] Additional barriers to participation include the administrative burdens associated with getting resources formally qualified and into the software systems used by the network of dispatching centers. Some states have stepped in to facilitate these agreements with local partners or sponsor local responders to dispatch through the national system.[34] States are also able to move local and state resources around outside of the national system through state compact agreements, state to state agreements, and Emergency Management Assistance Compacts (EMACs).[35]

To participate in the national mobilization system, responders must meet the National Wildfire Coordination Group (NWCG) standards for their position, which are tracked on an Incident Qualification Card, commonly referred to as a red card.[36] The NWCG establishes incident position standards to ensure consistency in training, experience, and fitness level for those mobilized to fill resource orders, regardless of agency employer.[37] Adopting NWCG qualifications is policy for federal firefighters and those working on federal fires , while non-federal fire response organizations can choose to adopt these standards or use their own.[38] Certain states, like California, have their own system for tracking position qualifications and local fire departments may issue their own certification standard or qualification equivalency, and so not all firefighters are red carded.[39] State compact agreements and state to state agreements are capable of accepting the qualifications and standards set by participating states in order to move and utilize resources.[40]

32 Wildland Fire Mitigation and Management Commission, *supra* note 1, at 108.

33 *Id.*

34 *Id.*

35 Phone interview with Greg Smith, Fire Director, National Association of State Foresters (March 21, 2025)

36 National Wildfire Coordinating Group, *National Wildfire Coordinating Group* (last visited Apr. 17, 2025).

37 *Id.*

38 Phone interview with Greg Smith, Fire Director, National Association of State Foresters (March 21, 2025)

39 *Id.*

40 *Id.*

Photo credit: David Gomez, iStock

THE WILDFIRE RESPONSE WORKFORCE

We now turn to the size and composition of the wildfire response workforce, which we consider in the following categories: federal, Tribal, state and local, and private. Within each category's workforce there may be multiple different types of personnel who assist in fire response either directly as firefighters or indirectly by providing support services. The following definitions are used throughout the section to categorize personnel and the capacities to which they engage in wildland fire response.

Primary firefighters are those whose "duties are primarily to perform work directly connected with the control and extinguishment of fires or the maintenance and use of firefighting apparatus and equipment."[41] Primary firefighters are further categorized as permanent, full-time firefighters who work year-round; permanent-seasonal firefighters who do not work year-round but have permanent positions; or temporary-seasonal firefighters who are hired for a single season and whose term of employment generally cannot exceed 1,039 hours worked.[42]

Secondary firefighters are those who are clearly working in the firefighting field in an administrative or supervisory position for an agency responsible for fire response.[43] Many secondary firefighters have transferred from primary positions and maintain operational firefighting qualifications. Others may provide logistical, financial, or incident management support during fire response.

Collateral duty firefighters – also known as non-fire ready reserve, militia, or supplemental firefighters and support staff – are those whose primary duties do not include fire response but who hold firefighting qualifications and/or are mobilized in a support function when needed.[44] Examples of this include trail crew members and recreation staff who are red-carded due to the similar nature of their work to fire response, or other field-going staff who, in addition to their regular jobs, are responsible for fire response in areas where fire is infrequent enough to not warrant primary firefighters.[45]

41 Office of Personnel Management, 5 C.F.R. § 831.902.; Firefighters may work in operational roles, such as on handcrews, engines, or operating heavy equipment or aircraft, or in support services, such as dispatch or cache staff. Handcrews are responsible for constructing fireline, conducting burn operations, or mopping-up fires to ensure they are extinguished. There are three types of handcrews: type 1, type 2IA, and type 2. Type 1 handcrews have the highest minimum qualification standards. There are two types of Type 1 crews: Type 1 California crews, which are funded and governed by CalFire, or Interagency Hotshot Crews (IHCs), which can be funded and governed by either federal, state, Tribal, county or municipal firefighting agencies as long as they maintain compliance with interagency standards. Type 2 IA crews are capable of initial attack and therefore have higher training and qualification requirements than Type 2 crews. Other firefighters use equipment to assist in fire suppression. Dozers help build fireline and construct fuel breaks. Engines carry specialized equipment to spray foam and water. Engine crews play an important role during initial attack, and are utilized on large incidents to protect structures, roads, and other infrastructure, and also as a holding resource during firing operations. Water tenders are used to refill engines on the fireline. National Interagency Fire Center, *Our Resources* (last visited Apr. 19, 2025).

42 United States Government Accountability Office, Wildland Fire: Barriers to Recruitment and Retention of Federal Wildland Firefighters, i, 5, November 2022.

43 Office of Personnel Management, 5 C.F.R. § 831.902.

44 U.S. National Park Service, *Preparing for Fire* (last visited Apr. 17, 2025).

45 *Id.*

Fire departments are composed of **volunteer firefighters** and/or **career firefighters**.[46] Career firefighters are full-time firefighters, while volunteer firefighters are active part-time (call or volunteer) firefighters.[47] In this report, we consider career and primary firefighters as two separate groups that do not overlap: career firefighter refers to those employed full-time by a local fire department, while primary firefighter refers to those whose job duties are primarily fire response within federal, state, or Tribal agencies.[48] Most career firefighters serve in departments that work for communities of 25,000 or more people, while the majority of volunteer firefighters serve communities of less than 25,000, with about half of volunteer firefighters working for small, rural departments serving fewer than 2,500 people.[49] Volunteer firefighters comprise 65% of the local fire service, and they play a significant role in initial fire response given their presence in rural areas.[50]

Administratively determined (AD) firefighters, also known as casual hires or emergency firefighters, are hired temporarily to supplement agency resources when an emergency arises.[51] This hiring mechanism allows already qualified resources – often retired or former firefighters, fire department members, or federal employees in non-pay status – to be mobilized to an incident to fill personnel requests.[52] Administratively determined firefighters play an especially important role on incident management teams (IMTs): in 2023, ADs made up 21% of all personnel rostered to IMTs.[53]

Federal

Federal land management agencies administer the management of federal lands for many purposes, such as recreation, conservation, and natural resource use.[54] Fire management is included in this charge, and federal agencies that administer federal lands have the legal authority for fire protection within their jurisdictions.[55] There are five federal agencies predominantly responsible for fire protection on federal lands: the Department of Agriculture's Forest Service (USFS), and the Department of the Interior's Bureau of Land Management (BLM), Bureau of Indian Affairs (BIA), National Park Service (NPS), and Fish and Wildlife Service (FWS).[56] The Department of Defense,

46 The National Fire Protection Association defines fire departments as "a public organization that provides fire prevention, fire suppression, and associated emergency and non-emergency services to a jurisdiction such as a county, municipality, or organized fire district." Rita Fahy, Ben Evarts & Gary P. Stein, *U.S. Fire Department Profile,* National Fire Protection Association, August 2022.

47 *Id.*

48 See the full definition of primary firefighters above.

49 *Id.*

50 *Id.*

51 Big Rivers Forest Fire Management Compact, *AD Casual Hire* (last visited Apr. 17, 2025).

52 *Id.*

53 Incident management teams are dispatched during complex emergency incidents to manage the operational, logistical, planning, fiscal, and other issues associated with emergency response. IMTs are staffed by people from federal, state, Tribal, or territorial entities whose incident management responsibilities are collateral duties in addition to their regular jobs. National Interagency Fire Center, Incident Management Teams (last visited Apr. 19, 2025); Data from the Incident Workforce Development Group, *2023 Interagency Incident Management Team Composition Data* (last visited Apr. 17, 2025).

54 Laura A. Hanson and Carol Hardy Vincent, *Federal Land Ownership: Overview and Data*, Congressional Research Service (February 21, 2020).

55 Donald K. Artley, *Wildland Fire Protection and Response in the United States: The Responsibilities, Authorities, and Roles of Federal, State, Local, and Tribal Government, supra* note 19, 11.

56 United States Government Accountability Office, *Wildland Fire: Barriers to Recruitment and Retention of Federal Wildland Firefighters, supra* note 41, 4.

Department of Energy, and Bureau of Reclamation also have some wildland fire protection responsibility, though it is very minor compared to the direct protection areas and workforces of the other agencies.[57] While each of these federal agencies has their own mission to provide a unique land management service, their fire management programs are designed to enable workforce interoperability through shared policy, training, and qualification standards.[58]

The Forest Service provides fire protection on approximately 232 million acres of land.[59] The USFS employs the most robust federal firefighting workforce, employing 11,343 primary wildland firefighters[60] and contracting an additional 4,791 ADs in 2024.[61]

The four primary fire protection agencies within the Department of the Interior (DOI) employ most of the remaining federal firefighting workforce[62], with 5,780 firefighters hired across all agencies in Fiscal Year (FY) 2024.[63] This workforce was supplemented with 2,972 Administratively Determined personnel and over 3,300 collateral duty staff.[64] The fire response workforces of each DOI agency are described below, though the numbers of secondary and collateral duty positions by agency are unknown.

- **Bureau of Land Management.** As the largest fire protection agency within the Interior, the Bureau of Land Management employs the majority of the firefighters within Interior to provide fire protection on approximately 254 million acres of land.[65] In FY 2024, the BLM's fire management program hired 3,658 firefighters, and contracted 1,142 Administratively Determined personnel.[66]
- **National Park Service.** The National Park Service provides fire protection on approximately 85 million acres of land and hired 944 firefighters in FY 2024.[67] The NPS also contracted 617 ADs.[68]
- **Fish and Wildlife Service.** The Fish and Wildlife Service provides fire protection on approximately 150 million acres of land. FWS employs 579 firefighters, supplemented through contracts with 223 ADs.[69]

57 Donald K. Artley, *Wildland Fire Protection and Response in the United States: The Responsibilities, Authorities, and Roles of Federal, State, Local, and Tribal Government, supra* note 19, 11.

58 *Id.*

59 *Id.*

60 This number includes those within firefighter job series at a GS 9 or below. *U.S. Forest Service, Wildland Firefighting Workforce* (last visited Apr. 19, 2025).

61 Forest Service ECI Report as of 1/12/2025, U.S. Forest Service, *Incident Business Practices Personnel* (last visited Apr. 19, 2025).

62 The Department of Defense (DoD) also contributes to the federal fire response workforce through an interagency agreement with the Departments of Agriculture and the Interior, which enables the DoD to provide firefighting assets – including aircraft and ground resources – to support fire response when needed. National Interagency Fire Center, *Military Support* (last visited Apr. 19, 2025).

63 Email from DOI Office of Wildland Fire (March 3, 2025).

64 *Id.*

65 *Id.*

66 *Id.*

67 *Id.*

68 *Id.*

69 *Id.*

- **Bureau of Indian Affairs.** The Bureau of Indian Affairs provides fire protection on lands held in trust by the federal government for federally recognized Tribes.[70] The BIA employs approximately 563 firefighters to provide fire protection in cases where the BIA administers wildfire programs using BIA employees.[71] An additional 935 ADs are available to be hired as needed.[72]
- An additional 36 permanent fire program staff are employed by other agencies within the DOI.[73]

In total, the 2024 federal firefighting workforce was composed of 17,123 primary fire management staff, 7,763 Administratively Determined hires, and over 18,000 red card holding secondary fire or collateral duty staff.

The reductions in the federal workforce occurring during early 2025 is likely to impact the availability of federal fire response resources: for example, of the 3,400 Forest Service probationary employees who were initially terminated, more than 75% held wildland fire qualifications.[74] As noted above, collateral duty or secondary firefighters make up almost half of the total federal fire response workforce. Reducing the non-primary fire workforce, or eliminating the funding or other supports that sustain it, will significantly hinder federal fire response capabilities.

Tribal

A fundamental condition of Tribal self-governance and self-determination is "sovereignty over stewardship of lands, waters, and natural resources within [Tribal] lands of territorial affiliation."[75] Indigenous people and their fire management practices have long shaped landscapes across North America.[76] However, non-Indigenous settlers established a very different relationship with fire, forcibly removing Indigenous people off most of their ancestral territories, criminalizing Tribal fire use, and suppressing naturally ignited fires.[77] To this day, wildfire governance continues to prioritize federal and state decision making, marginalizing and hindering the full participation of Tribes and Indigenous people in fire management.[78] The federal government exerts control over Tribal fire management in part through the Bureau of Indian Affairs charge to provide wildland fire protection on lands held in trust for Tribes.[79] While some Tribes elect for the BIA to continue providing wildfire protection services, others utilize the Indian Self Determination and Education Assistance Act (ISDEAA) to receive funding to implement their fire management programs directly.[80]

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70 Please see the following section to learn more about the Tribal fire management workforce.

71 Email correspondence with Department of Interior Communications staff.

72 *Id.*

73 Id.

74 Frank R. Beum, Board Member, National Association of Forest Service Retirees, Testimony Before the Senate Committee on Agriculture, Conservation, Forestry, Natural Resources and Biotechnology (March 6, 2025).

75 Clark, Sara A., Bill Tripp, Don L. Hankins, Colleen E. Rossier, Abigail Varney & Isobel Nairn, *Good Fire II: Current Barriers to the Expansion of Cultural Burning and Prescribed Fire Use in the United States and Recommended Solutions*, 1, 18, March 2024.

76 *Id.*

77 *Id.*

78 *Id.*

79 Interview with Jim Durglo, Fire Technical Specialist, Intertribal Timber Council (February 5, 2025).

80 *Id.*

Under the Indian Self Determination and Education Assistance Act, Tribes are enabled to compact or contract the management authority of their fire programs from the Bureau of Indian Affairs.[81] Also known as "638" compacts or contracts, ISDEAA provides a mechanism for the transfer of authority and funding over certain federal programs that serve Tribal members – including those administered by the Bureau of Indian Affairs and Indian Health Services – from a federal agency to a Tribal government.[82] 638 compacts/contracts enable Tribes to design and implement programs locally and to hire their own employees.[83] Tribes may elect to compact or contract the entirety of their fire program, part, or none of it.[84] Of the 574 federally recognized Tribes, 90 manage their own wildland fire programs.[85] **Collectively, these programs employ 924 primary firefighters, supplemented by an estimated 600 secondary and collateral duty employees.**[86]

638 compacts and contracts are an important mechanism to exercise Tribal sovereignty and self-determination, yet challenges remain in fully actualizing this intent.[87] While they enable Tribes to set priorities and provide services as they see fit, certain actions still require BIA approval or oversight, and while ISDEAA obligates federal agencies to adequately fund Tribal programs, underfunding, compounded with the BIA's inability to move funds efficiently or effectively, remains a concern.[88] A result of these challenges is that the Tribal fire workforce has often gone uncounted or been left out of reforms to better support firefighters.[89] For example, the firefighter pay increase authorized by the 2021 Bipartisan Infrastructure Law did not extend to Tribal firefighters, despite 638 contracts requiring Tribes to follow BIA rules and guidelines.[90] Because of advocacy by the Intertribal Timber Council and Tribes, the DOI eventually extended the pay increase to Tribal firefighters.[91] Importantly, the permanent pay fix for wildland firefighters, authorized in March 2025, also makes permanent Bureau of Indian Affairs funding for Tribes to offer the pay supplement to Tribal wildland firefighters.[92]

The initial exclusion of Tribal firefighters from the 2021 pay supplement daylighted another issue: the BIA did not know how many firefighters worked for Tribal fire programs under 638 contracts.[93] This oversight has important implications, as employee numbers are used in national appropriations for fire preparedness funding.[94] Without data

81 Pub. L. No. 93-638, 88 Stat. 2203 (1975).

82 Clark, Sara A., Bill Tripp, Don L. Hankins, Colleen E. Rossier, Abigail Varney & Isobel Nairn, *Good Fire II: Current Barriers to the Expansion of Cultural Burning and Prescribed Fire Use in the United States and Recommended Solutions*, 1, 18, March 2024.

83 *Id.*

84 Oversight Hearing: "Advancing Tribal Self-Determination: Examining Bureau of Indian Affairs' 638 Contracting," House Committee on Natural Resources, 118th Congress (Mar. 6, 2024).

85 U.S. Department of the Interior, *Improving Wildland Fire Management Across Tribal and Federal Lands* (last visited Apr. 19, 2025).

86 Interview with Jim Durglo, Fire Technical Specialist, Intertribal Timber Council (February 5, 2025).

87 *Id.*

88 *Id.*

89 *Id.*

90 *Id.*

91 *Id.*

92 U.S. Department of the Interior, *The Department of the Interior Announces Permanent Pay Increase for Wildland Firefighters to Bolster the Nation's Wildfire Response* (last visited Apr. 19, 2025).

93 Interview with Jim Durglo, Fire Technical Specialist, Intertribal Timber Council (February 5, 2025).

94 *Id.*

on the Tribal fire response workforce, appropriations may be inadequately funding fire management programs.[95] Some Tribes have reported that their fire preparedness funding from the BIA has barely increased since they first contracted their fire management program, which in certain cases was up to a few decades ago.[96] However, fire activity within Tribal protection areas has risen dramatically over that same time frame, alongside increased cost of living and the need to provide competitive wages to recruit and retain employees.[97]

This disconnect between the management need for firefighting capacity and the annual funds afforded for preparedness forces Tribes to pursue additional funding sources to cover programmatic costs and provide competitive wages.[98] Ensuring that Tribal workforces under 638 contracts are properly accounted for and included as part of the national fire response workforce is a first step in addressing the challenges described above.[99]

State and local

Almost all states have the statutory authority and responsibility to protect state and private land from wildfire.[100] However, the role of state agencies charged with fire management can vary greatly: some provide direct protection services themselves, others assist the local governments or fire response organizations providing the protection, and most do some combination of the two.[101] Fire protection at the local level is also variable, as fire protection responsibility on city or county land can be provided by a number of types of entities, which can differ between and even within states.[102] These entities include municipal fire departments, county fire departments, volunteer fire departments, fire protection districts, and private fire districts under contract.[103] Most local firefighters provide emergency services and all-hazard response within their area of jurisdiction, and wildland fire may be either a small portion or the majority of the calls they respond to.[104] Because of the close relationship between state and local fire response organizations, we consider their workforces together in this section.

It is estimated that together, state and local fire protection agencies field a workforce of about 100,000 firefighters.[105] Exact numbers are difficult to find at the state level because state fire organizations use different mechanisms for tracking firefighting personnel and their qualifications, and smaller agencies in particular rely heavily on collateral duty firefighters. The contributions of volunteer firefighters at the local level makes this segment of the

95 *Id.*

96 *Id.*

97 *Id.*

98 *Id.*

99 See Clark, Sara A., et al., *Good Fire II: Current Barriers to the Expansion of Cultural Burning and Prescribed Fire Use in the United States and Recommended Solutions*, for additional recommendations on further enabling Tribal fire management and capacity.

100 Donald K. Artley, Wildland Fire Protection and Response in the United States: The Responsibilities, Authorities, and Roles of Federal, State, Local, and Tribal Government, Int'l Ass'n of Fire Chiefs, supra note 19, 20.

101 *Id.*

102 *Id.* at 24.

103 Phone interview with Bob Roper, Senior Policy Advisor, Western Fire Chiefs Association, (January 31, 2025).

104 Donald K. Artley, *Wildland Fire Protection and Response in the United States: The Responsibilities, Authorities, and Roles of Federal, State, Local, and Tribal Government,* Int'l Ass'n of Fire Chiefs, supra note 19, 24.

105 Phone interview with Greg Smith, Fire Director, National Association of State Foresters (March 21, 2025).

workforce difficult to capture and also means that this workforce is likely – and perhaps significantly -- undercounted. There are over one million career and volunteer firefighters in the United States working for almost 30,000 fire departments across the nation.[106] About 65% of firefighters are volunteers, and 82% of all fire departments are categorized as mostly-volunteer or all-volunteer.[107] A 2021 survey of US fire departments by the National Fire Protection Association found that 87% of fire departments are responsible for wildland and wildland-urban interface fires.[108] This suggests that the number of local firefighters who contribute to wildfire response is much higher than what has been reported, perhaps upwards of 800,000 people.

Municipal, volunteer, and county fire departments play an especially important role during the initial attack phase of wildfire response. According to the National Association of State Foresters, an average of 80% of wildfires in the United States occur on non-federal lands, where state and local firefighters are the first responders.[109] Fires on non-federal land account for about 45% of acres burned by wildfire every year.[110] If the complexity of the wildfire incident exceeds the capabilities and resources of the initial responders, additional local, Tribal, state, or federal resources are mobilized.[111] In cases where non-local firefighting resources are also needed, local fire departments typically become responsible for structure protection.[112]

In addition to their responsibilities at the local level, state and local firefighters contribute to national fire response efforts. In 2024, there were 97,449 resource orders filled by state personnel through the national mobilization system.[113] About 1/3 of those state personnel dispatched through the national mobilization system ended up on federal fires.[114] Figure 3 demonstrates the considerable role that state and local firefighters (shown in light blue) play on large incidents, in particular by staffing engines. States and counties contribute the largest share of engine personnel to large incidents, which is especially important given the increasing occurrence of wildfires in the wildland urban interface.[115] In addition to providing engine equipment and staffing capacity, state and local firefighters play an important role on incident management teams: in 2023, 13% of rostered IMT members were state employees, and 11% were from local government.[116]

106 Rita Fahy, Ben Evarts & Gary P. Stein, U.*S. Fire Department Profile*, National Fire Protection Association (August 2022).

107 *Id.*

108 National Fire Protection Association, *Needs Assessment of the United States Fire Service: Wildland and Wildland-Urban Interface Firefighting* (December 2021).

109 Phone interview with Greg Smith, Fire Director, National Association of State Foresters (March 21, 2025).

110 *Id.*

111 Donald K. Artley, Wildland Fire Protection and Response in the *United States: The Responsibilities, Authorities, and Roles of Federal, State, Local, and Tribal Government,* Int'l Ass'n of Fire Chiefs, supra note 19, 20.

112 *Id.*

113 This number reflects all resource orders filled by state personnel rather than individual personnel who were mobilized, meaning that the same person could have filled multiple resource orders. Phone interview with Greg Smith, Fire Director, National Association of State Foresters (March 21, 2025).

114 *Id.*

115 The wildland urban interface is the area where human development sits within or adjacent to vegetation. The number of fires and acres burned within the WUI are both on the rise. Wenfu Tang et al., *Disproportionately Large Impacts of Wildland-Urban Interface Fire Emissions on Global Air Quality and Human Health,* 11 SCI. ADVANCES (2025).

116 Incident Workforce Development Group, 2023 Interagency Incident Management Team Composition Data (last visited Apr. 17, 2025).

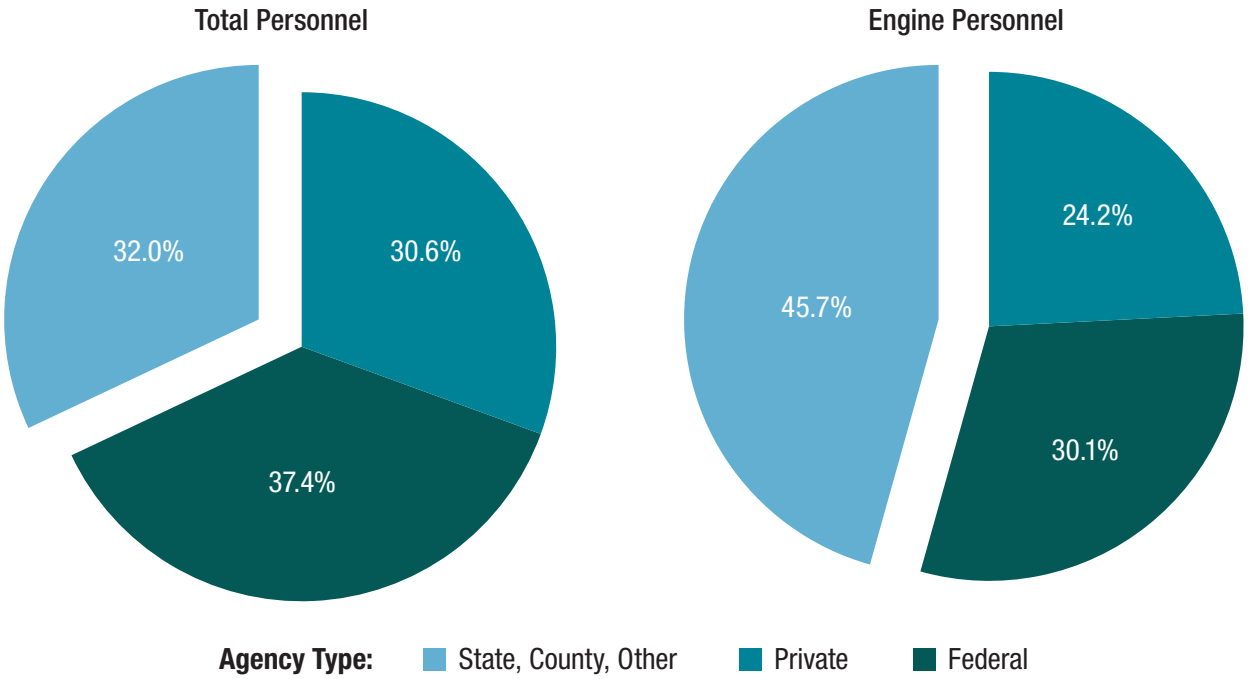

Figure 3. State and county share of total personnel and engine personnel on large incidents between 2019 and 2023.[117] **State and county personnel account for 32.0% of total personnel, which includes engines, crews, aviation, and overhead, but 45.7% of total engine personnel, which includes just personnel staffing engines and heavy equipment.**

The size and capacity of state fire protection workforces differs state by state, from California employing one of the largest fire management workforces in the world to Wyoming with only a few seasonal firefighter positions each year.[118] Most state fire protection agencies employ permanent and seasonal staff dedicated to fire response, but also rely heavily on a 'ready reserve' of non-fire staff to support fire operations when needed.[119] This reservist portion of the workforce can be difficult to count. While some employees in this category maintain fire qualifications, most assist in logistics, business, or on incident management teams that aren't as easily tracked.[120] To supplement their in-house fire response workforce, many states partner with the Department of Corrections to provide hand crews and/or with the National Guard under a state declaration of emergency to provide aerial assets, hand crews, or security.[121] States may also directly contract private vendors for additional engines, hand crews, heavy equipment,

117 Data for this figure is from Lise A. St. Denis et al., *All-Hazards Dataset Mined from the U.S. National Incident Management System* 1999–2020, 10 Sci. Data 112 (2023).

118 See below for additional information on the size and composition of both Wyoming and California's fire management workforces.

119 Interview with George Geissler, State Forester and Deputy Supervisor of Wildland Fire Management, Washington Department of Natural Resources (Jan 29, 2025).

120 Wildland Fire Mitigation and Management Commission, *supra* note 1, 174.

121 Interview with George Geissler, State Forester and Deputy Supervisor of Wildland Fire Management, Washington Department of Natural Resources (Jan 29, 2025).

aviation, or support services.[122] To highlight the variability in size and composition of state and local fire response workforces, the following section offers profiles of four western states.

The Role of Incarcerated Firefighters in Fire Response

There are an estimated 3,100 incarcerated firefighters currently eligible and trained to assist in fire response within the 13 western states.[123] This number has declined in recent years, in part following certain criminal justice reforms that led to a decrease in people incarcerated for committing low level offenses, who would be eligible to work on wildfire crews.[124] These crews are generally made available through partnerships between a state firefighting agency and the Department of Corrections, and typically cannot leave the state, thus supporting the individual state's needs but not available capacity for other states.[125] Like any firefighter, incarcerated firefighters receive training and must pass a physical fitness test to be red-carded.[126] However, most incarcerated firefighters earn a much lower wage than their counterparts, and formerly incarcerated firefighters face barriers accessing careers in wildland fire upon reentry. Some states are working to address these issues: the state of Washington passed legislation to ensure that incarcerated firefighters earn minimum wage when on wildland fires[127], and California authorized an expedited expungement process for former participants of conservation camp fire crews.[128] However, challenges remain in properly counting, compensating, and retaining these firefighters both during and after their sentence.[129]

122 *Id.*

123 This includes: 1800 incarcerated firefighters in California (Interview with Justin Schmollinger, Assistant Region Chief -- Southern Region, CalFire (February 6, 2025)); 200 in Washington (Interview with George Geissler, State Forester and Deputy Supervisor of Wildland Fire Management, Washington Department of Natural Resources (Jan 29, 2025)); 366 in Oregon (Interview with Michael Curran, Fire Protection Division Chief, Oregon Department of Forestry (February 13, 2025)); 10 in Wyoming (Interview with Jerod DeLay, Assistant State Forestry, Wyoming State Forestry Department (January 31, 2025)); 15 in Montana (Interview with Matt Hall, Fire Chief, Montana Department of Natural Resources Forestry Division (March 5, 2025)); 240 in Arizona (Arizona Department of Forestry and Fire Management, State Forestry Crews (Accessed April 21, 2025)); 300 in Nevada (Riley Snyder, State prison officials want to cut number of inmate firefighting camps in half, The Nevada Independent, April 20, 2023); 55 in New Mexico (New Mexico Energy, Minerals and Natural Resources Department, Inmate Work Camp, (accessed Apr. 21, 2025)); and 40 in Colorado (Reuben M. Schafir, Colorado Inmate Fire Crew Slashes Brush in La Plata County, The Durango Herald, Jan. 23, 2023).

124 Interview with Justin Schmollinger, Assistant Region Chief -- Southern Region, CalFire (February 6, 2025)

125 Interview with George Geissler, State Forester and Deputy Supervisor of Wildland Fire Management, Washington Department of Natural Resources (Jan 29, 2025).

126 *Id.*

127 *Id.*

128 Bradan Litzinger, *Expedited Expungement and Its Limits: AB 2147 as a Peak of Progress*, University of California, Los Angeles Law Review, November 2023.

129 For recommendations on improving opportunities for career advancement for currently and formerly incarcerated firefighters, please see the Institute for Research on Labor and Employment's *Creating Career Opportunities for Formerly Incarcerated Firefighters*; Elizabeth Brown, et al. *Creating Career Opportunities for Formerly Incarcerated Firefighters*, Institute for Research on Labor and Employment, University of California, Berkeley, September 2022.

California

California's Department of Forestry and Fire Protection, known as CAL FIRE, is currently the second largest employer of wildland firefighters in the world, behind the United States Forest Service, and the largest state-run fire department. CAL FIRE is responsible for fire response on State Responsibility Area (SRA) lands, which account for 31 million acres of state and private land, about one third of California's total landmass.[130] The SRA excludes federal lands as well as urban areas protected by local fire agencies. However, cities and counties may contract CAL FIRE to provide fire protection and other emergency services within their jurisdictions: 115 local governments, including 36 of the state's 58 counties, have such agreements.[131] Conversely, CAL FIRE has agreements with six counties – including Los Angeles, Santa Barbara, Orange, Kern, Ventura, and Marin Counties – to take on fire protection responsibility for SRA land within their county.[132]

CAL FIRE's workforce is currently composed of approximately 12,000 employees, about 85% of whom serve in primary firefighting positions.[133] CAL FIRE's staffing levels have increased significantly over the years, with the number of firefighters jumping from 5,756 to 10,275 between 2014 and 2024.[134] The agency has begun to implement another staffing increase to reduce firefighter weekly workload from 72 to 66 hours, which was agreed upon in the 2022 Bargaining Unit 8 Memorandum of Understanding, with appropriations approved by the California Legislature as part of the 2024-25 budget.[135] To accommodate the reduced workload while maintaining staffing levels, CAL FIRE is undertaking a major hiring increase over the next five years, with the goal of employing almost 14,000 firefighters by 2029.[136]

CAL FIRE supplements its in-house firefighting workforce with over 2,500 additional firefighters through partnerships with the California Conservation Corps (CCC), the California Department of Corrections and Rehabilitation (CDCR), and the California National Guard.[137] For almost a hundred years, CAL FIRE has relied on incarcerated individuals within its workforce, beginning during World War II when CAL FIRE's workforce was depleted and incarcerated individuals staffed 41 temporary camps to provide additional firefighting capacity.[138] Now known as the Fire Camp program, CAL FIRE continues to work with CDCR to provide hand crews staffed with incarcerated individuals and led by CAL FIRE captains.[139] At its peak, the Fire Camp program had around 198 hand crews made up of over 4,000 people.[140] While still robust, the CDCR Fire Camp program has shrunk in recent years, in part due to criminal justice reform, and

130 California Department of Forestry and Fire Protection, Fire Protection (last visited April 19, 2025).

131 *Id.*

132 Interview with Justin Schmollinger, Assistant Region Chief – Southern Region, CalFire (February 6, 2025)

133 Sarah Heard & Bradley Franklin, *Building California's Forest Resilience Workforce,* The Nature Conservancy, June 2023.

134 Gabriel Petek, The 2024-25 Budget: *CalFire—Implementation of a 66-Hour Workweek,* California Legislative Analyst's Office, March 2024.

135 Interview with Justin Schmollinger, Assistant Region Chief – Southern Region, CalFire (February 6, 2025)

136 *Id.*

137 Sarah Heard & Bradley Franklin, *Building California's Forest Resilience Workforce*, The Nature Conservancy, June 2023.

138 California Department of Corrections and Rehabilitation, Conservation (Fire) Camps Program (accessed April 21, 2025).

139 *Id.*

140 Interview with Justin Schmollinger, Assistant Region Chief – Southern Region, CalFire (February 6, 2025)

now has 65 crews staffed by around 1,800 people.[141] In part to fill this gap, CAL FIRE has developed a partnership with California Conservation Corps to operate 26 hand crews composed of about 400 Corpsmembers with CAL FIRE captains.[142] Another 14 hand crews are provided by the California National Guard, staffed by 300 members of the Guard.[143]

Utah

Utah's Division of Forestry, Fire, and State Lands is statutorily responsible for fire protection on state and private unincorporated land in Utah.[144] On municipal and county lands, fire departments are required to provide initial attack capabilities.[145] If the incident exceeds the capacity of the local response resources, the responsible department can delegate management of the fire to the state of Utah or a federal agency.[146] The state employs a fire warden in each county to represent state interests in local fire protection and coordinate the suppression effort. Utah fields a workforce of both state firefighters and local fire department staff who are signed up on cooperative agreements.[147]

Utah's local fire service includes 4,600 red-carded firefighters.[148] Fire department firefighters only have to be red-carded in order to remain on an incident once it has been delegated to either the state or a federal agency, so this number does not represent all firefighters in the state.[149] The Division of Forestry, Fire, and State Lands employs about 300 primary fire staff.[150] There are also an estimated 20 non-fire red-carded agency staff.[151] Utah no longer works with the Department of Corrections to provide hand crews, and does not often utilize the National Guard.[152] The state has its own contracts for heavy equipment, and contracts through the Forest Service's Virtual Incident Procurement (VIPR) system for other resources.[153]

The state of Utah fields initial attack crews, engine crews, and fuels crews, as well as two Interagency Hotshot Crews, the only state besides Alaska to have its own hotshot crews.[154] A third hotshot crew has just earned IHC Type 1 status, this one sponsored by the Unified Fire Authority of Greater Salt Lake, which is the largest fire department in the state of Utah.[155] This will be the only current municipally-sponsored hotshot crew in the country.[156] Interagency

141 *Id.*
142 *Id.*
143 *Id.*
144 Phone interview with Brett Ostler, State Fire Management Officer, Utah Department of Natural Resources (March 4, 2025).
145 *Id.*
146 *Id.*
147 Phone interview with Brett Ostler, State Fire Management Officer, Utah Department of Natural Resources (March 4, 2025).
148 *Id.*
149 *Id.*
150 *Id.*
151 *Id.*
152 *Id.*
153 *Id.*
154 *Id.*
155 *Id.*
156 *Id.*

Hotshot Crews are nationally shared resource, meaning that they could be assigned to incidents anywhere in the country.[157] Though Utah's hotshot crews may spend most of their time outside of the state, they are an important resource to the state for the fuels and prescribed fire work they are able to accomplish outside of the peak fire season, and for the relationships and reputation they help build for the state with partners across the West.[158]

Wyoming

Local and county resources are predominantly responsible for wildfire response on state and private lands in Wyoming.[159] There are about 140 fire departments within the State's 23 counties.[160] These fire departments rely on approximately 4300 firefighters, about 85% of which are volunteer and 15% are career firefighters.[161] The state's fire management agency, the Wyoming State Forestry Division, serves primarily to support these local resources, providing wildland fire training for fire departments across the state as well as fiscal support when requested.[162] The Forestry Division employs about 50 agency staff, an estimated 75% of which hold collateral duties in wildland fire response.[163] There are only 5 primary firefighters employed by the state of Wyoming at part of the Wyoming State Helitack crew.[164] Additional state capabilities include two contracted single engine air tankers and four engines that could be staffed with collateral duty firefighters if needed.[165]

Oregon

The Oregon Department of Forestry (ODF) provides fire protection on 16 million acres of land statewide, including private industrial and non-industrial timber lands, state, county, and municipal lands, and some public lands through agreements with federal partners.[166] Oregon's local fire service is primarily responsible for structure protection, while ODF protects the wildlands.[167] ODF employs approximately 600 primary seasonal firefighters, including dispatchers, lookouts, and fire cache staff.[168] This is in addition to 469 primary permanent fire protection full time employees.[169] Approximately 530 collateral duty staff maintain fire qualifications or provide overhead, logistic, business, or incident management support when needed.[170]

157 *Id.*

158 *Id.*

159 Phone interview with Shad Cooper, Sublette County Fire Warden (February 3, 2025).

160 *Id.*

161 *Id.*

162 Phone interview with Jerod Delay, Assistant State Forester, Wyoming State Forestry Division (January 31, 2025).

163 *Id.*

164 *Id.*

165 *Id.*

166 Interview with Michael Curran, Fire Protection Division Chief, Oregon Department of Forestry (February 13, 2025).

167 Id.

168 *Id.*

169 *Id.*

170 *Id.*

While ODF maintains the majority of its initial attack capabilities in-house, the agency supplements this workforce with contractors, especially for extended attack and large incidents.[171] ODF has a mechanism through the Forest Service's VIPR system to access contract crews, so that contractors are saved from signing multiple agreements across agencies.[172] ODF partners with the Department of Corrections to staff Adult in Custody crews.[173] There are currently 366 incarcerated firefighters participating in these crews.[174] ODF has also helped train approximately 200 National Guard members, which includes personnel for six 20-person hand crews in addition to aviation and support staff.[175] Given their robust use of contractors as well as collateral duty firefighters, ODF does not often utilize an AD program, though they do have the capability if needed.[176]

Private

Private wildland firefighting resources are contracted to provide wildland fire services on an as needed basis.[177] There are three primary ways that the private fire service is utilized during fire response: under contracts with state or federal agencies; contracted with insurance companies providing structure protection; or contracted directly with private landowners.[178] In general, the majority of private companies work under government contracts, while those working for insurance companies or private landowners make up a small portion of the industry.[179] As such, the private sector is mostly used to provide additional response capacity when fire activity exceeds federal or state agency resources.[180]

The industry was established in the 1980s, when the unpredictability of both fire activity and agency budgets created the need for a resource pool that could be easily mobilized and only paid for when used.[181] Private contracting emerged as a resource pool with greater perceived flexibility and cost-effectiveness, and are now used primarily on large incidents, while federal, state, and local resources are responsible for the majority of initial-attack.[182] There are a few types of businesses that provide fire suppression services.[183] Forestry equipment contractors use fire suppression contracts to supplement their work in the forestry industry, often by providing suppression hand crews made up of forestry workers.[184] Commercial services equipment contractors mainly provide equipment

171 *Id.*

172 See the following section on the private fire service for more information on the role that the state of Oregon has played in administering contracts with private fire contractors.

173 *Id.*

174 *Id.*

175 *Id.*

176 *Id.*

177 Phone interview with Debbie Miley, Executive Director, National Wildfire Suppression Association, (February 4, 2025).

178 *Id.*

179 *Id.*

180 *Id.*

181 *Id.*

182 *Id.*

183 Heidi Huber-Searns, Autumn Ellison, Olivia Molden, Jessica Neafie & Cassandra Moseley, *Profiles of Fire Suppression Contracting Businesses,* Institute for a Sustainable Environment, University of Oregon, Spring 2016.

184 *Id.*

for fire camps such as handwashing stations and portable toilets.[185] For most commercial service contractors, fire suppression contracts supplement their work in the construction or transportation industries.[186] Fire-focused equipment contractors are those that purchased equipment and hired fire suppression hand crews specifically to fill fire suppression contracts.[187] Many fire-focused contractors may also pick up forestry contracts, but earn the majority of their income in fire suppression.[188]

The size of the private fire service is significant: **estimates indicate that the private fire service is composed of about 15,000 people across all resources**, including aviation, ground personnel, heavy equipment, and commercial services.[189] This includes 11,000 professionally trained wildland firefighters, which is about the size of the Forest Service's primary firefighting workforce.[190] Commercial service contractors support firefighters at fire camps by providing catering, showers, hand washing stations, toilets, and other equipment. Private industry also provides an estimated 90% of the heavy equipment used on fires.[191] Heavy equipment is expensive for public agencies to purchase and maintain on their own but is more cost effective for those in the private sector who utilize them year-round in other industries.[192]

Private companies also field many handcrews. The following section focuses on these contract crews as an informative case study to evaluate the role of private industry in fire response, due to the type of data that can be gathered on handcrews in particular. However, as noted above, crews are just one of the many resource types that contractors provide. As Figure 4 demonstrates, private industry supplies a growing share of personnel on handcrews, with 35.3% of all fire crew personnel on large incidents hired by private contractors on average between 2019-2023, compared to 25% between 2014-2019.

185 *Id.*

186 *Id.*

187 *Id.*

188 *Id.*

189 Phone interview with Debbie Miley, Executive Director, National Wildfire Suppression Association, (February 4, 2025).

190 *Id.*

191 *Id.*

192

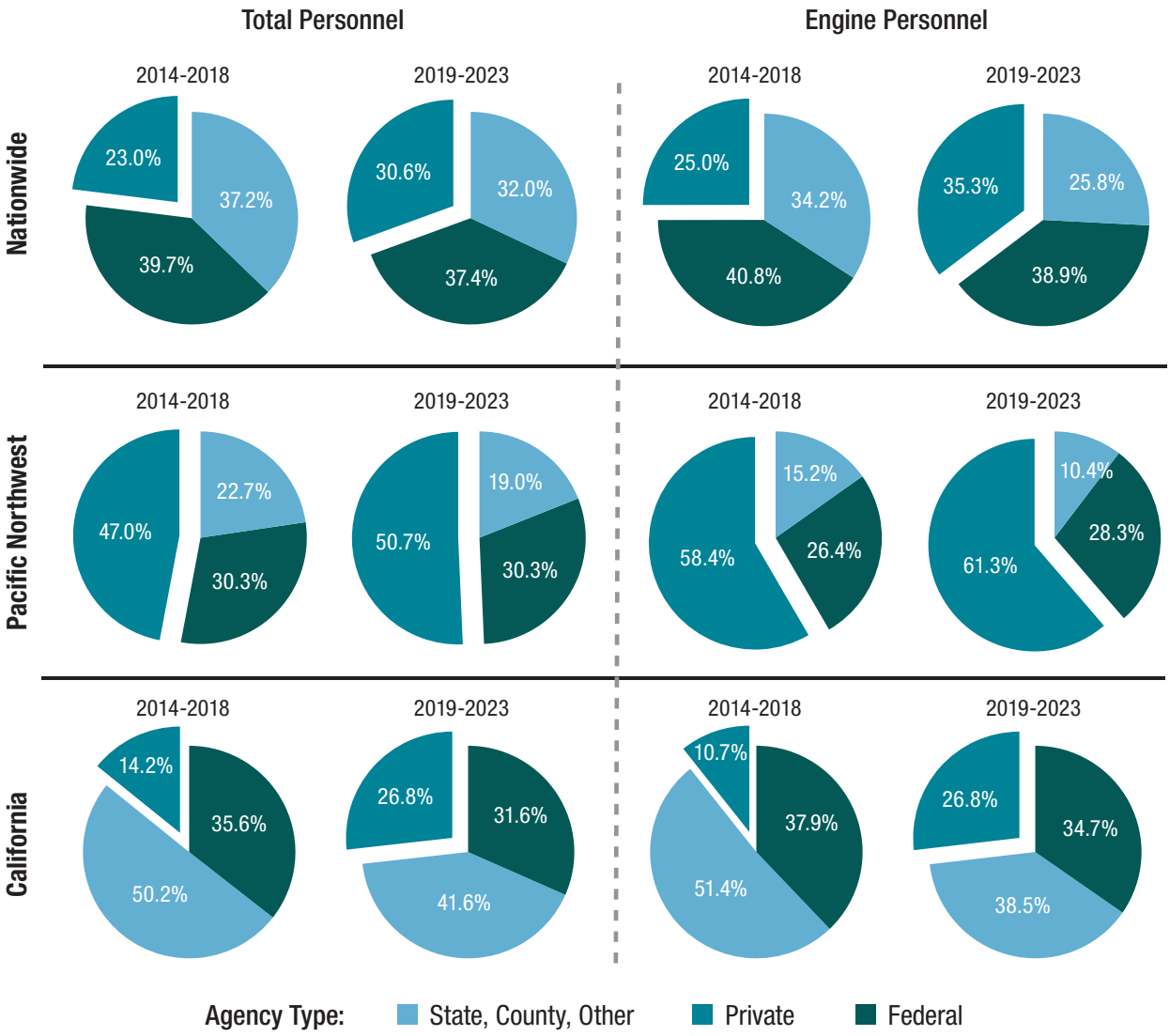

Figure 4. Private sector share of total personnel and hand crew personnel on large incidents over time and by region.[193] Private resources account for an increasing proportion of total resources on large incidents, much of which is driven by a higher reliance on contracted hand crews, as the right columns show. Private resources provide the majority of total personnel in the Pacific Northwest, which includes Oregon and Washington, and their increased rate of use in California is above the national trend. Total personnel includes engines, crews, aviation, and overhead.

193 Data for this figure is from Lise A. St. Denis et al., All-Hazards Dataset Mined from the U.S. National Incident Management System 1999–2020, 10 Sci. Data 112 (2023).

Regional Differences in Private Contractor Use

The share of private industry in fire response is even higher in certain regions like the Pacific Northwest, where contracted resources account for 50.7% of total personnel, and 61.3% of handcrew personnel, on large incidents.[194] In other regions like California, the share of personnel from private hand crews is increasing at a greater rate than the national average. The use of contract crews in California has significantly increased in the last five years as the number and availability of inmate fire crews, which would be included as part of state/county resources in Figure 4, has dropped.[195] The concentration of resources in the Pacific Northwest can be at least partially attributed to the presence of a pre-existing forestry workforce with the skill sets, training, and equipment that could easily translate to fire suppression.[196] There is a long history of labor-intensive forestry practices in the Northwest, from logging to reforestation and tree planting to fuels reduction projects and, most recently, fire response.[197]

These industries have all required a large workforce and have increasingly relied on immigrant communities to meet this labor need.[198] Today, Latino/a workers make up the majority of forestry services workers in the region and a growing share of forestry businesses are Latino/a owned.[199] The use of temporary foreign labor is also on the rise, with the number of workers on H-2B visas in the Pacific Northwest growing by 650% in the last ten years.[200] In 2023, Oregon and Washington had a combined 7,874 certified H-2B workers, with forestry as the top industry employer for guest workers in both states.[201] To put that in perspective, the Forest Service's Region 6 – which includes Oregon and Washington – hired 1,992 firefighters in 2024.[202] The use of both undocumented and H-2B workers means that the labor-intensive workforce that dominates forestry and fire contracts often goes undercounted and undercompensated. These workers are also at greater risk of poor working conditions or violation of labor laws (such as wage theft) due to fear of retaliation and a lack of protections given their immigration status.[203]

194 *Id.*

195 Phone interview with Alex Robertson, Deputy Director of Fire and Aviation Management, USDA Forest Service (February 5, 2025).

196 Emily Jane Davis, Carl Wilmsen, Manuel A. Machado & Gianna M. Alessi, Multiple Stories, Multiple Marginalities: The Labor-Intensive Forest and Fire Stewardship Workforce in Oregon, 6 *Fire* 268 (2023).

197 *Id.*

198 *Id.*

199 *Id.*

200 *Id.*

201 American Immigration Council, *The Expanding Role of H-2B Workers in the United States*, October 2024.

202 U.S. Forest Service, Wildland Firefighting Workforce (accessed April 21, 2025).

203 Carl Wilmsen, Diane Bush & Dinorah Barton-Antonio, Working in the Shadows: Safety and Health in Forestry Services in Southern Oregon, Journal of Forestry, May 2015.

The size of the private sector can be difficult to accurately capture not just because of the type of workforce it relies on but also because of the way contracts are issued, particularly for handcrews. Until 2021, the Oregon Department of Forestry (ODF) administered the inter-agency agreement for Type 2 crews.[204] In 2021, the Forest Service opted not to participate in a contract renewal, citing a lack of oversight and high costs, before taking over administration of the agreement themselves.[205] At the time of its termination, there were 250 Type 2 hand crews contracted through the ODF-administered agreement, which was a "best value contract" based on both merit and price that incentivized crews to perform at higher standards to be dispatched more frequently.[206] That number has risen to 626 Type 2 handcrews under the Forest Service-administered agreement, which does not limit the number of participating crews.[207] It is unlikely, however, that there are actually enough personnel to fill each crew.[208]

Under the ODF contracts, each individual crew member was assigned a unique ID number.[209] Now, crews are only registered through the name of the crew boss, making it difficult to know how many individuals are in the system.[210] Furthermore, perverse incentives may exist for some contractors to take advantage of this structure to add more crews than they can staff and then move personnel around to fill resource orders as they come, increasing the frequency with which their contract is utilized and, in turn, increasing the profitability of their contracts.[211] However, under this system, contractors may have greater flexibility to respond to the variabilities between fire seasons and demand for resources, alleviating some uncertainty regarding the amount of work a private fire service employee can expect in a given timeframe.[212]

Some private contractors have critiqued the new agreement for its "lowest price technically acceptable" structure, which has forced contractors to drive their bidding price lower in order to remain competitive.[213] Contract crews must meet the same NWCG training and position requirements as any other federal, state, Tribal, or local resource must to be dispatched through the national resource ordering system.[214] However, encouraging contractors to place lower bids may incentivize unintended outcomes such as crews fast-tracking their employees to earn higher qualifications sooner, or labor violations like wage theft , especially in cases where legally vulnerable workers, such as undocumented or migrant workers, are employed.[215] It may also push some contractors who are unable to compete with these lower prices out of the industry.[216]

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204 Phone interview with Debbie Miley, Executive Director, National Wildfire Suppression Association, (February 4, 2025).

205 *Id.*

206 *Id.*

207 Phone interview with Debbie Miley, Executive Director, National Wildfire Suppression Association, (February 4, 2025); U.S. Forest Service, 2024 Type 2 Crews–1449 & Rate Sheet (accessed April 21, 2025).

208 Phone interview with Debbie Miley, Executive Director, National Wildfire Suppression Association, (February 4, 2025).

209 *Id.*

210 *Id.*

211 *Id.*

212 Heidi Huber-Searns, Autumn Ellison, Olivia Molden, Jessica Neafie & Cassandra Moseley, *Profiles of Fire Suppression Contracting Businesses,* Ecosystem Workforce Program, Institute for a Sustainable Environment, University of Oregon, Spring 2016.

213 Phone interview with Debbie Miley, Executive Director, National Wildfire Suppression Association, (February 4, 2025).

214 *Id.*

215 *Id.*

216 *Id.*

In addition to Type 2 crews, there are 42 Type 2 IA contract crews.[217] These contracts are also awarded through a national acquisition process, but the structure of the agreement differs from the Type 2 contracts due to the need for Type 2 IA crews to mobilize quickly to respond to emerging incidents.[218] Type 2 IA crews are held to a mandatory availability period where they must be able to respond to a resource order or else are penalized.[219] This is unlike the Type 2 agreement, where crews face no consequence for being unable to respond to dispatches – another reason there are likely more crews listed than people to fill them.

Many states now also contract directly with private vendors, who may choose to be under contract with either the Forest Service or a state(s) or both.[220] At the state level, contracted resources are used to supplement the state and local workforce. The State of Washington, for example, increases their ground resources by more than a quarter with contract resources.[221] Contracting with a state may offer more consistent work as there is less competition, and some state officials reported viewing their relationships with contractors more as a partnership than a business.[222] Another benefit is that states often pay contractors faster than the federal government.[223] A result, however, of vendors having separate contracts with both state and federal agencies is increased difficulty knowing how many crews are available, as well as potential double-counting when estimating the size of the workforce.

While continued work to capture the true size of the private fire response workforce is important both in terms of worker protection and efficient resource utilization, the growing role of the private sector is undeniable. Private industry has traditionally played an especially important role during periods of high fire activity, when federal, state, and local resources are more likely to already be committed to incidents or providing baseline coverage to respond to new wildfires.[224] Through the National Multi-Agency Coordinating Group, representatives from wildland fire agencies establish Preparedness Levels (PLs) to reflect regional and national fire activity levels throughout the year.[225] Preparedness Levels (PLs) also provide information on national resource availability/scarcity, with preparedness level 1 indicating low fire activity and a high number of available resources and preparedness level 5 indicating high fire activity with most resources committed to incidents.[226] Increases in preparedness level signal that the availability of resources is declining.[227]

217 *Id.*

218 Interview with Alex Robertson

219 *Id.*

220 Interview with George Geissler, State Forester and Deputy Supervisor of Wildland Fire Management, Washington Department of Natural Resources (Jan 29, 2025).

221 *Id.*

222 *Id.*

223 *Id.*

224 Phone interview with Debbie Miley, Executive Director, National Wildfire Suppression Association, (February 4, 2025).

225 USDA Forest Service, *National Fire Preparedness Levels* (accessed April 21, 2025).

226 *Id.*

227 *Id.*

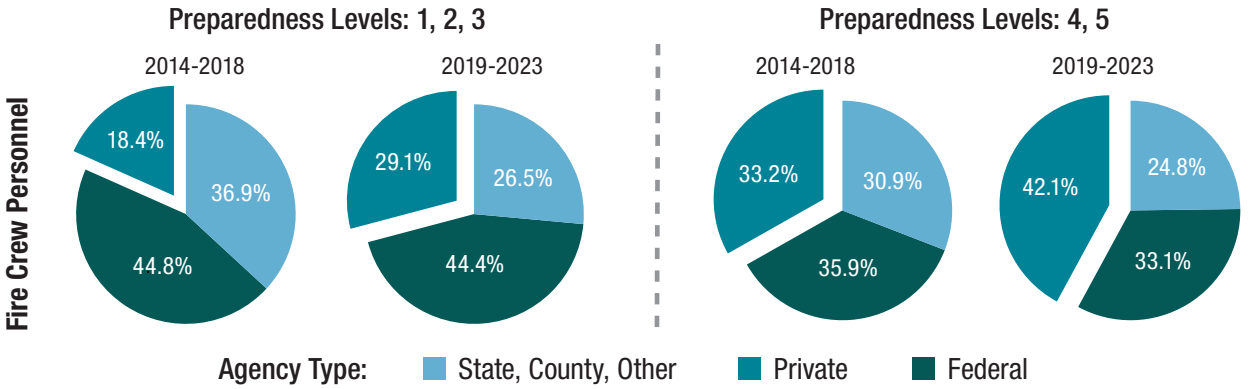

Figure 5. Private sector share of crew personnel on large incidents over time and by preparedness level.[228] **Reliance on contract crews has increased over time at all levels of national fire activity. Contract crews are most utilized during national Preparedness Levels 4 and 5, when national fire activity and resource scarcity is highest.**

Figure 5 shows the use of contract hand crews on large incidents across preparedness levels and over time. During periods of high fire activity (PLs 4 and 5), contractors now provide the largest share of personnel on hand crews, surpassing federal agency personnel. Importantly, however, contract crews are becoming increasingly relied upon even at times of low fire activity, when federal, state, county, and other resources are more likely to be available (PLs 1, 2, and 3). The usage of contract crews is growing at a comparable rate during these lower preparedness levels as it is at PLs 4 and 5, which indicates a general shift towards private resources at all levels of national fire activity. Further research into the reasons behind this shift is needed (proposed areas of study are described in the conclusion), to understand how the growth of the private sector might impact suppression costs, worker safety, and productivity, as well as the size and utilization of other segments of the workforce.

228 Data for this figure is from Lise A. St. Denis et al., *All-Hazards Dataset Mined from the U.S. National Incident Management System 1999–2020*, 10 Sci. Data 112 (2023).

Photo credit: AegeanBlue, iStock

SUMMARY AND CONCLUSION

In summary, we estimate that the wildland fire response workforce includes:

- **Federal.** 17,123 primary firefighters, supplemented by 7,763 Administratively Determined hires and over 18,000 collateral duty staff;
- **Tribal.** 924 primary firefighters, supplemented by an estimated 600 collateral duty staff;
- **State and local.** 100,000 firefighters employed across state fire organizations and local fire departments, supplemented by a workforce of many more career and volunteer firefighters serving departments that are responsible for wildland and wildland-urban interface fire response; and
- **Private.** 11,000 firefighters, supplemented by an estimated additional 4,000 contractors to provide incident management support services.

As the numbers above illustrate, the size of the wildland fire workforce is immense. The largest employers of firefighters are the USFS and CAL FIRE. In addition to employing seasonal and permanent firefighters, most state, federal, and Tribal fire management organizations operate under an 'all hands on deck' model, where staff in non-fire positions take on roles to support fire response when the need is high. Additional workforce capacity comes from individuals hired as emergency firefighters such as ADs, Department of Corrections fire crew programs, or private contractors, all whose roles are heavily integrated within the fire response system.

It is important to note that not all of these actors are in use at the same time, and they may play different roles in fire response depending on factors such as the level of fire activity or time of year. At the highest level of fire activity, it is estimated that there are upwards of 30,000 firefighters assigned to incidents nationwide.[229] When not assigned to fires, members of the response workforce may be providing baseline coverage to support resources that are committed elsewhere, accomplishing fire mitigation work such as fuels reduction, or executing their regular duties if they aren't primary firefighters.

The response system must continue to be evaluated to ensure that total workforce capacity is reflected in the available response pool. As it stands, non-federal entities may be underutilized at the national level due to the high administrative burden, complexity, and lengthy reimbursement process that current agreement structures require.[230] The recent reductions to and instability within the federal wildland fire response workforce emphasize the need to create a system more inclusive of and responsive to the capacities and operating environments of non-federal entities.[231]

229 Nguyen, D., Belval, E.J., Wei, Y. et al. Dataset of United States Incident Management Situation Reports from 2007 to 2021. Sci Data 11, 23 (2024).

230 Wildland Fire Mitigation and Management Commission, *supra* note 1, at 109.

231 See the Wildland Fire Mitigation and Management Commission, supra note 1, Chapter 3: Responding to Fire, for recommended solutions to reform cooperative compacts, reimbursement processes, and agreement structures.

A greater understanding of the size and composition of the wildland fire workforce is required to improve the effectiveness of the national fire response system by ensuring that all sectors of the workforce are included and utilized to their full capabilities. Better quantification of this workforce may also aid in securing equal compensation and protection for workers regardless of their employer or employment type and ensuring that there is appropriate oversight to support both employers and workers within the wildland fire response system. This paper provides an initial look at the roles of and resources available to different fire response organizations.

Some of the key trends seen in the data to date include:

- The workforce is not solely or even mostly composed of federal wildland firefighters. Though federal partners played a primary role in developing the national fire response system, the needs and capacity of the system have evolved and would likely benefit from better incorporating local resources. However, the system remains challenging for non-federal fire response entities to navigate.
- Certain segments of the workforce – in particular local, Tribal and private fire organizations – have historically been undercounted and underrecognized within the fire response system. Some Tribes reported that this has impacted funding levels, putting the burden on Tribes to provide competitive wages and benefits that regular appropriations do not cover. Members of private industry expressed dissatisfaction with a federally administered system that encourages vendors to compete for the lowest rates, which in turn may impact worker protection, safety, or production on the fireline.
- Private contractors are becoming an increasingly large segment of the wildland fire response workforce in the United States, reflecting the need for greater surge capacity as large campaign fires have become more common over the past decade. The growing contributions of private industry to wildfire response are important to recognize, and an increased reliance on the sector should be accompanied by the necessary oversight to ensure equal protection and compensation.

Photo credit: Iaguy2, iStock

Further research can help daylight additional nuances and implications of the data provided. To build on these findings, we recommend investment in the following areas of inquiry:

- Quantifying the number of days worked by individuals from different sectors of the workforce, in particular those in surge capacity roles such as non-fire staff, AD/casual hires, and contractors. This will add to our understanding of how many total potential firefighters contribute to fire response by showing how the frequency with which they are utilized.
- Studying how individuals build careers in and move through the wildland fire response system. Understanding the reasons that individuals enter, stay within, or leave different sectors of the workforce can help inform strategies to recruit and retain employees in the field.
- Analyzing the size and composition of the prescribed fire and/or fire mitigation workforce. Many of the firefighters included in this report also assist in prescribed fire or other fire mitigation projects, but a focused investigation into the prescribed workforce will improve our understanding of what capacity currently exists for prescribed fire and how that matches the need.
- Updating the existing research that compares the cost of different resource types, in particular between contractors and federal personnel.[232] While cost is just one factor that should determine how resources are utilized (other considerations should include proximity, qualifications and level of production, worker safety and well-being, etc.), this comparison could be used to inform federal staffing levels or to reconsider contract agreement rates and oversight to ensure parity in compensation and benefits.

The findings and conclusions in this report are those of the author(s) and should not be construed to represent any official USDA or U.S. Government determination or policy.

232 Geoffrey H. Donovan, A Comparison of the Costs of Forest Service and Contract Fire Crews in the Pacific Northwest, 20 W. J. Appl. For. 233 (2005).

Photo credit: Jorge Villalba, iStock

SUPPLEMENTAL INFORMATION

Methods

Wildland Fire Data

The ICS-209-PLUS dataset is compiled by U.S. Forest Service researchers from US National Incident Management System Incident Status Summary forms (ICS-209), which document (generally daily) information related to environmental hazard events, primarily wildfires. It includes counts of response personnel by type and agency, size and growth rates of fires, and incident management cost.[233] The data portrayed here was derived from an updated version of ICS-209-PLUS provided by the U.S. Forest Service and the Earthlab at the University of Colorado that includes incidents through 2023.

Three related ICS-209-PLUS tables were used to generate our estimates of wildland fire resource distributions: Resources, Incidents, and Complex Associations. The Resource file quantifies the daily number of individuals working on fire response – including general fire response crews, those on fire engines, aerial crews, and logistics–and breaks these counts down by their associated agency (federal, state, private, etc.). The Incident file describes the total acreage of each fire, as well as information on fire management costs, threatened structures, type of fuel, and location. The Complex Association file links member fires to larger complexes; it can be used to prevent double counting of resources from member fires and their parent complexes.

Dataset Processing

All data processing was performed in Python using the Pandas library. An overview of this process can be seen in SI Figure 1. After first standardizing date formats and field types, the Incident file was left-joined into the Resources file via the INCIDENT_ID field, providing information on fire location that can be used for filtering later in the pipeline. Next, any rows with null values for State and INCIDENT_ID were dropped.

A subset of wildfire incidents are considered part of a larger complex. Typically, when a complex is officially declared, all resources across member fires are recorded into the same parent complex INCIDENT_ID to simplify fire management. However, recorded resources for member fires may occasionally overlap with their parent complex. To address this and remove the possibility of double counting resources, we first left-joined the Complex Association Table to the Resources table via the INCIDENT_ID field. We then dropped any resources for member fires that occur during days where resources were recorded for the parent complex. Occasionally, resources may be recorded for the same INCIDENT_ID on the same day.

233 GLise A. St. Denis et al., All-Hazards Dataset Mined from the U.S. National Incident Management System 1999–2020, 10 Sci. Data 112 (2023).

Crew resource data is typically filed daily, but occasionally resource data can be filed multiple times per day. In these cases, we dropped duplicate daily records, taking only the first set of resources recorded each day for each agency. Additionally, there may be missing daily resources in the records. This occurs when there was no change in crew information from the previous day on a fire. To account for these cases, we first separate resources data based on INCIDENT_ID, and additionally by response agency. From the first recorded day of the INCIDENT_ID to the last, we forward fill daily resources for each agency separately. We then concatenate all of these forward filled dataframes into a single dataframe.

To prepare this data for plotting, we first filtered fire resources based on the State in which the fire occurred, the Preparedness Levels it occurred during, and the fire crew type of interest. We then aggregated agency types, combining all Federal agencies into a single column and combining State, County, and Other resources. The metric of labor used was personnel-days–defined as simply the number of individual crew members per day, per agency, across all fires of interest.

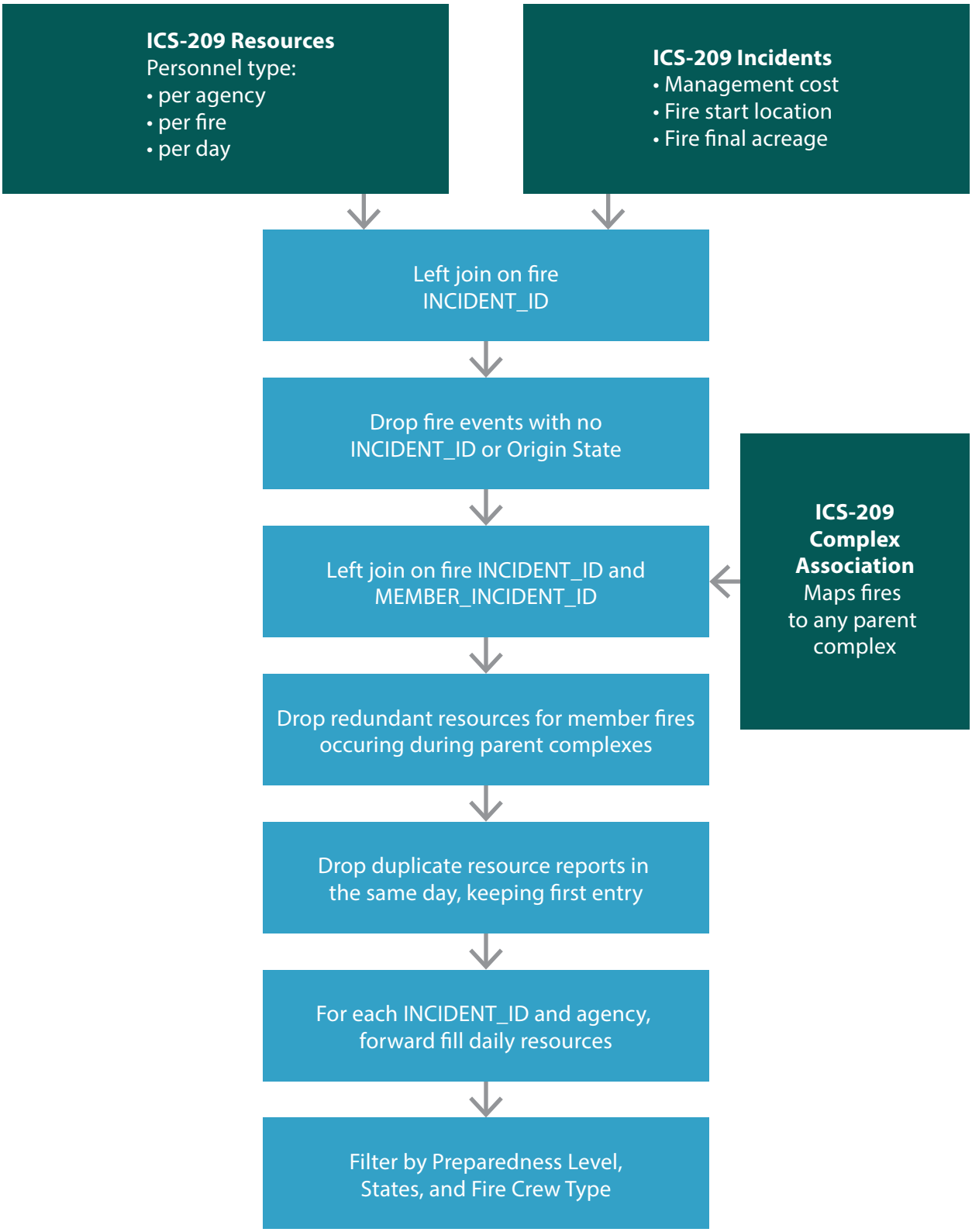

Figure 6. **Flowchart illustrating the Python data processing pipeline for ICS-209-PLUS data.**

Photo credit: Zview, iStock

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